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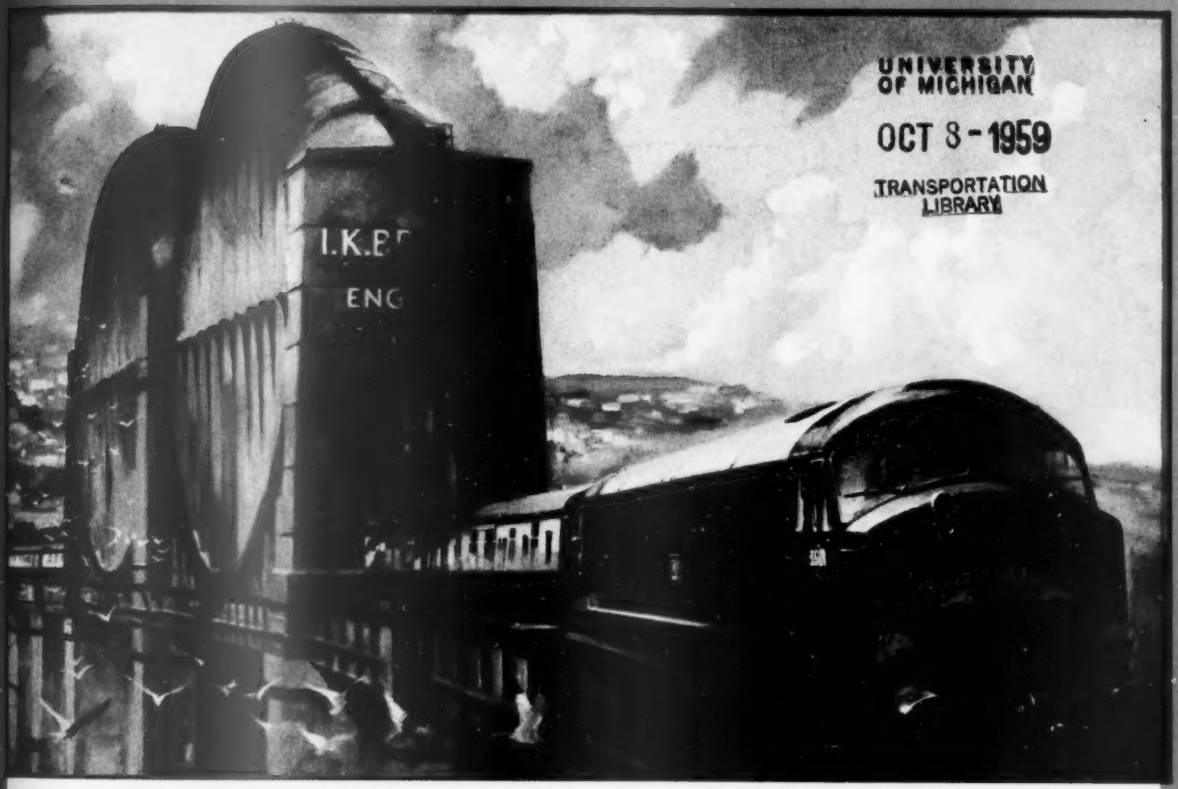

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Better Steel Figures

THE August figures of production issued by the Iron & Steel Board are encouraging. They show that the recovery in steel output is still gathering momentum, although it still has a long way to go before it can be considered satisfactory, especially from the prospect of it being fully reflected in railway traffics. The increase over last year, which had been less than 2 per cent in June and July, was 13 per cent in the latest period. Satisfaction at this improvement must be mitigated by the fact that a year ago steel was at its worst point in the recent recession. Nor must it be overlooked that production is still by no means up to that of two years ago, and that even now the industry is working at little more than 80 per cent of capacity. The greatest increase in demand has been for bars, rolled strips, wire rods, and tubes, and there has been no reduction of demand for sheets and tinplate. This shows clearly that the increase has gone very largely to the building and lighter engineering trades, apart from the motor-car and domestic appliances manufacturers, whose needs have figured largely in the returns for some time. The heavy steel sector has shown nothing like so good a recovery, although there has been a slight improvement in orders for sections. There are signs of an improvement in heavy steel demands but the stock position in this section remains uncertain. Some of the largest users in normal conditions are continuing to reduce stocks and show little signs of taking any active steps to replace them. Much will depend on recovery in such basic industries as shipbuilding, coal mining, and railways. The outcome of the recent announcement of a General Election may be an important factor in deciding the trend of capital investment in a number of important steel-using industries, but so far as the three major industries just mentioned are concerned, there does not appear to be any immediate prospect of an increase in their demands for steel.

The Loco's President

THROUGHOUT the 45 years history of the Institution of Locomotive Engineers, since its incorporation in 1915, there has been no more genial occupant of the presidential chair than Mr. Alfred Smeddle, whose induction for the year 1959-60 is recorded elsewhere in this issue. This happy election should ensure amity and concord to the Council and leaven its counsels; but the presidency of Mr. Smeddle has at least two other notable aspects. First, it binds the Institution back to what were the days of rugged individualism among locomotive engineers, the times when the Locomotive Superintendent was the most important of the officials; for Mr. Smeddle's father, the last Locomotive Running Superintendent of the North Eastern Railway, began his career under the celebrated Edward Fletcher, who served his apprenticeship under Stephenson at the time the *Rocket* was being built. Those were the days, for example, when Samuel Johnson, the Midland Locomotive Superintendent, was known to send a message over the road at Derby to John Noble, the General Manager, to come and see him in the locomotive offices. Secondly, this presidential appointment terminates the splendid isolation of Swindon in regard to professional institutions and London activities, for—though it seems incredible—Mr. Smeddle is the first occupant of the chair at Swindon to occupy also the chair at No. 28, Victoria Street.

Increasing Use of British Standards

THE rapidly increasing impact of British Standard Specifications on all aspects of home and export business and the growth of international standards work to make possible a universal basis for production and purchasing are two important features reflected in the report for the year to March 31, 1959, of the British Standards Institution. The translation of British Standards into other languages and the publicity given to them overseas are clearly directed to further the highest ideals and traditions on which may be based Britain's continuing supremacy in many technical fields. The report gives details of important developments during 1958-59 in the activities of the International Organisation for Standardisation and the International Electrotechnical Commission. Reference also is made to the proposed integration of standards among European Common Market countries. Special features of B.S.I. technical activities include the co-ordination of many standards for steel and other basic materials, and the sharp increase in projects undertaken ; for example, 144 in the engineering division as compared with 92 the previous year. The growing support given by trade and industry is apparent from the number of subscribing members which was 10,605, an increase of six per cent over the figure for the previous year.

Increased Tourist Traffic in Britain

TOURISM contributed more to the prosperity of this country last year than ever before. The tourist industry of Britain is as large and rich as that of any other country in Europe. It earned £198,000,000 in 1958, including £60,000,000 paid to British carriers for fares, which revenue exceeded that earned by many of Britain's major exports. More than 1,250,000 visitors came from overseas, an increase of 7 per cent over the 1957 total. These are some of the facts stated in the report for 1958-59 of the British Travel & Holidays Association. The B.T.H.A. criticises the British people, stated to be slow to become tourist-minded. An increase is called for in accommodation at all price levels, to counter bids by other countries for traffic which is expected to grow rapidly in the years to come as standards of comfort rise. Construction of new hotels in London, the report maintains, is not keeping pace with the

growth of tourist traffic. The Association has suggested that " transport organisations should take, as they did in the past, a more active interest in this matter." No reference presumably is intended to the British Transport Commission, which operates five station hotels in London.

Railways Help to Develop Tourism

IN view of the part played by British Railways in movement of tourists, as for instance between the Southampton Ocean Terminal and Waterloo or between Kings Cross and Waverley during the Edinburgh Festival, it is surprising to find in the B.T.H.A. report no specific mention of railway travel. The B.T.C. and Regions of British Railways moreover have been active in advertising resorts and quoting attractive fares. Reference is made to the resumption in 1958 of no-passport day trips by railway steamer from Britain to France and *vice versa*. The Association rightly points out that the need to obtain passports and, in certain cases, visas to visit Britain puts this country at a disadvantage compared with competitors in Western Europe. As to the British holiday-maker, success in increasing traffic to resorts in Britain is stated to depend partly on extending the season from May to September. Any such spreading of the summer season peak load would greatly help the railways.

The Pennsylvania Looks Forward

DESPITE the recession in industry in the U.S.A. in the first half of 1958, bad weather, and a backlog of deferred maintenance combined with rising prices, the Pennsylvania Railroad succeeded in earning enough for a 25 cent dividend on $10 shares. The situation of this and other U.S.A. railways has been discussed from time to time in these pages. A feature of the message to stockholders from Mr. James M. Symes, President of the Pennsylvania Railroad Company, in the report for 1958, is his faith in the future. For the long run, he states, the outlook for the P.RR. " is one of fairly steady improvement." His reasons include the absence of any substitute for the railways " now or in the future, for producing mass transportation at the lowest full cost "; a more sympathetic attitude on the part of Congress in the matter of taxes; plans to curtail unremunerative passenger services and some form of local, State, or Federal subsidy for suburban services; future mergers of railways which will reduce costs and improve services; the growth of the population and gross national product, which will engender more traffic; and the development of " piggy-back " transport.

Health Service on the N.W.R. of Pakistan

MUCH attention is paid by railway managements in some countries where the standard of living is low, to the health of the staff and their families. The railways of India before Partition made great efforts in this field. Those of the Republic of India and of Pakistan today have continued this essential work. The North Western Railway of Pakistan, for instance, has done much to develop medical facilities, for the treatment of its 110,000 employees and their 400,000 relations. In 1957-58, 666,447 employees and 1,109,663 members of their families were treated as out-patients at the railway hospitals and dispensaries, where there were also 13,976 in-patients. The railway has 57 hospitals and dispensaries and 114 doctors, 88 of them graduates, five dental surgeons, and 57 nurses. Most notable is a 136-bed tuberculosis sanatorium equipped at a cost of Rs. 3,600,000 (£270,000); the first railway residential institution of its kind in India. About 600 tubercular patients have been completely cured. The sanatorium is situated in the dry air of Quetta, 6,000 ft. above sea level. All the wards have glazed verandahs and there are a solarium and recreation accommodation including a stage and cinema.

Diesel-Electric Trains for Oxted Line

INTRODUCTION of diesel-electric sets to work most of the services via the Oxted line of British Railways Southern Region, referred to elsewhere in this issue, will reduce the journey times over severe gradients and afford the other advantages associated with multiple-unit diesel working. It will result also in virtual elimination of steam working from Victoria, apart from such few Oxted line trains as may still be steam-hauled, for by that time electrification of the line to Folkestone and Dover via Ashford should be complete, and all boat trains electrically worked. The trains via Oxted to and from East Grinstead, Eridge, Tunbridge Wells West, Uckfield, and so on at present are the only regular steam workings in and out of the Central Division (former L.B.S.C.R.) side of the terminus. Passenger traffic has grown rapidly in recent years. There is certain to be a sharp rise when the diesel trains start to run, more particularly in morning and evening business traffic, for which the new sets will provide additional accommodation.

Experiment in Air Suspension

THERE is little doubt that a highly developed system of pneumatic vehicle suspension can help towards a new standard in comfort for rail and road travel. The automatic infinitely-variable adjustment of the spring rate to suit load conditions ensures this. On suburban railway services a light-weight vehicle must ride smoothly on indifferent track with widely varying conditions of load. These conditions are particularly arduous when applied to the four-wheel railbus of relatively short wheel-base, which becomes an ideal subject for experiment in the search by British Railways for any means of improving the factor of safety and passenger comfort at all speeds. Such an experiment is described elsewhere in this issue. The last of five Meadows-engined Wickham diesel railbuses placed by the British Transport Commission in 1957 has been fitted with Andre-Westinghouse air springs in a system of axle suspension designed and built by D. Wickham & Co. Ltd. Already preliminary trials have shown the immense possibilities which this form of suspension has for lightweight vehicles. Long-term trials are continuing on the Scottish Region, and upon their results will depend the decision whether to widen the scope of the experiment to embrace faster and heavier rolling stock.

B.T.C. Signal Development Centre

WHILE the primary function of railway signalling is still to ensure safety, its secondary value, that of increasing line capacity by permitting higher speeds at closer headways, assumes greater importance with the growth of modern traffic conditions. In recent months many papers have been read before the Institution of Railway Signal Engineers describing new equipment which will shortly become available to signal engineers. These developments result from research and experiment by manufacturers and such bodies as the Research Department at Derby of the British Transport Commission. Most of the promised apparatus is costly and its proper and economical use will only be ensured by its methodical and sound development. The new Signal Development Centre at Leyton described elsewhere in this issue, will undertake this responsibility as far as British Railways are concerned. Establishment of such a centre is sound policy. It will avoid regional duplication of work and will facilitate the spread of signalling knowledge. Its single, centralised existence will make possible the maximum measure of research at minimum expense, a factor of first importance at a time when modernisation and re-equipment must be carried out as economically as possible.

Remote Control on British Railways

AS described in our June 12 issue, the signalling installed in connection with British Railways, Southern Region, new electric services to the Kent Coast included remote control, with the aid of electronic equipment, of the Sittingbourne-Sheerness branch, where the operating conditions posed some special problems. The London Midland Region has since introduced remote control in re-signalling its lines from Crewe to Manchester via both Stockport and Styal in conjunction with electrification of these sections at 25 kV., 50 cycles a.c. The controlled area is divided into two zones directed from new signalboxes at Sandbach and Wilmslow. The equipment used operates on principles differing from those applying to the Sheerness branch. The work is described elsewhere in this issue. It forms part of a programme involving the re-signalling also of Manchester London Road Station

and its approaches, where equipment dating from the beginning of the century demands complete replacement. The power point mechanisms are electro-pneumatic, with air piping of plastic material—one of several notable features.

Joseph Locke Centenary

THE Paris-Rouen-Havre railway is one of the greater creations of Joseph Locke, its promoter and engineer. The Liverpool & Manchester, Grand Junction, and Sheffield & Manchester Railways and lines in Spain, Holland, and elsewhere owe their origins to him in varying degrees. It is fitting that the centenary of his death on September 18, 1860, should be celebrated at Rouen and Barentin, nearby, where the lofty viaduct carrying the Rouen-Havre line over a valley is a monument to his genius. It is hoped to hold the commemoration at Barentin on September 16-19, 1960, and to make it illustrate as comprehensively as possible the scope of his creative powers, including locomotives and rolling stock of the railways with which he was associated in France, Britain, and elsewhere, his relations with George Stephenson, and other features of railway historical interest. Those interested are asked to communicate with Mr. R. W. Allott, of 78, Ormond Drive, Hampton-on-Thames, Middlesex.

Britain's Railway Queen

ON Saturday, September 12, Britain's Railway Queen for 1959-60 was crowned jointly by Lord Rusholme, Member of the British Transport Commission and Chairman of the London Midland Area Board, and Mr. A. Hallworth, General Secretary of the Associated Society of Locomotive Engineers & Firemen. The ceremony, which was described in detail in our September 19, 1958, issue, is illustrated in this week's news section. An historical description of the office of the Railway Queen was given in our February 21 issue last year. At a luncheon before the ceremony, Lord Rusholme said he was proud of the way Miss Gloria Cripps, the retiring Queen, had carried out her duties, which had been difficult for so young a girl. He stressed the value of her year of responsibility and was sure it had made her a better citizen. Mr. Hallworth spoke of the unifying influence of the Railway Queen the world over, and Miss Cripps expressed her appreciation of the welcome she had received from every rank of railwayman from General Manager to apprentice. The newly-crowned Railway Queen is Miss Hazel Dobinson, the daughter of Mr. F. H. Dobinson, a machinist at Stooperdale Works, Darlington, North Eastern Region, British Railways.

Party Transport Policies

IT would seem that transport policy will play small part in the general election campaigns of any party. In their manifesto the Tories confine themselves to taking credit for the railway modernisation programme, an extensive roads programme, which they promise to double within the next five years, and a reference to the inquiry into rural transport. No reference is made to the financial difficulties of the British Transport Commission and how the accumulating deficits are finally to be dealt with if they are not to remain a permanent millstone round the neck of the Commission. In references to nationalisation, opposition to its extension is reiterated and further decentralisation and improved commercial operation are promised, but there is no mention of further denationalisation.

The Labour Party manifesto due this weekend is unlikely to be any more definite except for the certain promise of fulfilment of its pledge to renationalise long-distance road haulage. This is because consultations between the Trades Union Congress and the National Executive of the Labour Party, with the affected unions brought in, have failed to result in any definite transport policy. Disagreement is reported on two issues. First, the question of subsidisation which is understandably favoured by the railway unions, but is opposed by the transport workers. Second, the future of "C" licences is also in dispute. Here again the transport workers find themselves in an opposite camp to the railway workers and again for understandable reasons. Mr. Frank Cousins has to protect his workers' interests and is loath to agree to any restriction on control of the ancillary user which would result in a contraction of "C" licence fleets and redundancy among his men. Only some general statements on transport policy can therefore be expected from either side.

This is somewhat unrealistic because whichever party is returned on October 8 will be called on to deal with a serious transport situation. The British Transport Commission in its re-estimation of its financial position in the light of its modernisation programme hinted at the necessity for a capital reconstruction. Its view was that some relief must be given to the heavy interest burden on a capital structure which may be out of line with potential earnings. This arises not only from the vast modernisation programme, largely met by borrowings, interest payments on much of which is deferred and accumulates, but also from the borrowings for deficits and for the interest thereon.

It would be unrealistic as the Commission has indicated to expect that these liabilities can ever be serviced, let along repaid. In the last transport debate shortly before Parliament rose spokesmen for the Opposition came out in favour of a capital reconstruction scheme, by which they appeared to mean that the Commission should be relieved of sufficient of its interest charges to enable it to pay its way out of current earnings. The Government preferred to plead for time to consider the Commission's statement. This situation must be tackled, and almost certainly within the lifetime of the new Parliament, unless its life is short, as the maximum permitted deficit borrowings are likely to be exhausted within the next two years, if one may judge, by the continued disappointing results of British Railways receipts. It is, therefore, perhaps unfortunate that the electorate has not been given any clearer indication as to how the respective parties would deal with the situation. All it can do is to presume that each will adhere to its doctrine; the Conservatives putting their faith in decentralisation and commercial operation hoping that modernisation will save the day, and the Labour Party embarking on further nationalisation of the road haulage industry, restricting private enterprise road haulage, including "C" licence operations, and working towards a more integrated transport system and subsidising it if necessary.

Public Accountability at Work

THE Select Committee on Nationalised Industries, first set up in 1956 to examine the reports and accounts of the public corporations, has been engaging in self-examination and has issued a special report on its findings. Having conducted three inquiries into the industries, of which those concerned with the National Coal Board and the civil aviation corporations were the most important, it considered whether these inquiries could be better conducted with greater assistance than it receives from a Clerk of Committees. It took evidence from, among others, the Leader of the House and the Leader of the Opposition, the Comptroller & Auditor General, the Treasury and the Institute of Chartered Accountants. It leaves the final decision to the House of Commons itself, but it clearly comes down against provision of help from the Treasury, or by the Comptroller & Auditor General, because it is opposed to the nationalised industries being subject to external inquisition, and it favours the provision of further assistance by the House itself.

This seems a reasonable conclusion because it envisages the help being in the form of a qualified economist accountant; that is, someone able to delve into the complicated accounts of the boards and assist the members of the committee in deciding in which directions to pursue their inquiries. During recent years the staff of the House of Commons Library has been greatly enlarged and research work is undertaken for Members, for which economists and statisticians are employed. With this precedent in mind, the Select Committee sees no reason why assistance cannot be given through the department of the Clerk of the House. If this enables more thorough inquiries into the nationalised industries, and possibly more of them, to be undertaken, it would be desirable that the implied recommendation of the Select Committee should be accepted by the new Parliament.

Certainly when the report and accounts of the British Transport Commission come under the Select Committee's scrutiny, and they are the next due for attention, their complexity

and comprehensiveness need the most expert of accountants and economists to assess them. Lay members of Parliamentary Committees, which meet no more than weekly and only while the House is sitting, for the most part have neither the expert qualification nor the time to make such thorough assessments. If therefore the Committee is to continue to function it is desirable it should do so effectively, and it is questionable to what extent it can in such a case of the Commission's finances without expert help. It may well be that granted this it can contribute not to commercial success but to suggesting ways and means whereby future financial solvency might be achieved by means of reconstitution of its capital liabilities.

When the Select Committee was established there were differences between the Government and Opposition as to its desirability. The Government acted on pressure from certain of its back benchers for greater accountability of the nationalised industries to Parliament. The Opposition feared the aim was to provide a vehicle for attack on the industries. The trades unions were fearful lest it delve into wages and working conditions, matters for collective bargaining. Some Ministers responsible for the industries concerned had a different fear—that it would inquire into their relations with the Boards. In the event, it is only the last that has been realised. In the report on its last inquiry, the civil aviation corporations, which the printing dispute prevented being discussed in these columns, the policies of the Minister of Transport & Civil Aviation, though not directly criticised, were subject to much scrutiny and their adverse effect in some cases on the corporations' operations referred to, particularly in regard to the independent operators.

In this there is no harm as Parliament is entitled to be informed of the impact of its policy on the boards for which Ministers are responsible. It is undesirable that Ministers should influence the Boards in private and be able to avoid public and Parliamentary accountability for their actions. In providing a channel the Select Committee appears to have fulfilled a useful rôle. Apart from that, all of its reports so far published have provided a mass of additional material concerning the relationships between the Treasury and the boards, and the relationship of the responsible Minister to both, as well as a valuable analysis of the results of the operations of the nationalised industries. On balance, as a step towards the greater public accountability of the public corporations the Committee has proved its worth.

Crown Agents' Services

THE scope and moderate cost of the services performed on a non-profit-making basis by the Crown Agents for Oversea Governments & Administrations are not always appreciated by many who could make use of them. The Crown Agents are described in reference books as the commercial and financial agents of oversea Governments. They themselves refer to the administrations, including railway managements, for whom they act as their "principals." These descriptions show that the two present holders of the office of Crown Agent, Sir Stephen Luke and Sir Alfred Savage, and their staffs have been appointed for the sole purpose of serving the Governments and administrations which employ them. They carry out this duty on the direct instructions of those principals, whose servants they are, without the interference of any authority in London or elsewhere.

There is no basis for the misconception which still lingers in some quarters, that the office is a department of the British Government, and that it is financed by the Exchequer. The only element of control by the Government of the United Kingdom is the ultimate responsibility of the Agents to the Secretary of State for the Colonies, by whom they are appointed and to whom they must present an annual audit of their accounts. Although the staff of over 1,600 is recruited, except for engineers and other professional men and specialists, from the Civil Service Commission lists, and their pay and conditions are regulated by the Secretary of State, the Crown Agents and their staffs are not civil servants. There are 250 engineers, including a considerable number with railway, civil, electrical, and mechanical engineering experience. The office depends entirely on the fees it receives from its principals for services rendered, and with minor exceptions, such as a share of brokerage on certain categories of investments, receives no commission or other remuneration from any other source. Charges are kept low. Some services are provided free. If there is a surplus of revenue after making due provision for all necessary reserves it is dealt with either by a reduction of fees or by a distribution to principals in proportion to the volume of business transacted.

The organisation dates back to 1833, when the agencies of British colonies overseas were replaced by a single establishment from which the present organisation has developed. In contrast to earlier limitations its operations now extend into the international field. The present list of principals as at June, 1959, numbers over 200. It includes independent Governments both within and outside the Commonwealth, besides Colonial Governments. The independent Governments include Ceylon, Ghana, Jordan, Libya, the Federation of Malaya, besides the United Nations and many municipalities and public bodies, including the East African Railways & Harbours Administration, the Nigerian Railway Corporation, Ghana Railway & Harbours, and the Ceylon Government Railway.

Although it acts as agent for Government and Government-sponsored bodies only and cannot act for non-official commercial concerns, this is almost the only restriction. Besides the supply of anything from a toothbrush to a locomotive, the Crown Agents handle purchase, shipment, insurance and inspection of stores; designs and specifications; contracts; negotiation, issue and management of loans, investments and liquid balances; transfer of stocks, and various payments, salaries, allotments, pensions, estates, widows' and orphans' pensions schemes. They undertake to select and engage staff and arrange passages. Postage stamps are wholesaled, literature published and sold. Four drawing offices, a packing warehouse and a laboratory are maintained. Liaison with shipping companies is preserved by a branch of the Shipping Department in the City of London, where advice may be obtained on special freight problems. A stock transfer branch is also maintained in the City for the convenience of brokers. Their main function as regards railways concerns plant, equipment, and stores, which they purchase, inspect, ship and insure to a very great value each year. It includes locomotives, rolling stock, bridges, rails, buildings, and all classes of railway material. This involves close contact with the manufacturers of railway material.

A major service provided by the Crown Agents is the organisation and secretariat of the conferences held regularly in London, under the chairmanship of the Engineer-in-Chief, on standardisation of colonial railway equipment. The many useful results include agreement to adopt 3 ft. 6 in. as the future gauge for all railways in tropical Africa. The wealth of knowledge possessed by the Crown Agents staff of the widely differing needs and circumstances of railways in many parts of the world is shared only by those manufacturers of railway material who export to a wide variety of countries.

Internal Reorganisation of C.I.E.

A SPECIAL Commercial Department will be set up soon by Coras Iompair Eireann to spearhead an intensive drive for more passenger and freight business.

This is part of a scheme of internal reorganisation which C.I.E. intends to implement over the next two years. There will be a large scale revision of freight rates. The outmoded freight rates which had previously hampered C.I.E. in its effort to negotiate transport deals with traders were abolished by the 1958 Transport Act. The new found trading flexibility had already enabled the company to conclude a steadily increasing number of "Package Deals."

The new reorganisation scheme aims at decentralising authority. Local management organisations will be set up in four main provincial centres under the supervision of Area Managers. In this way the management will be broad-based and will, in itself, encourage that flexibility which is the keynote of the present campaign for more business.

Also being set up is a new Organisation & Personnel Department which will incorporate the existing Staff Relations Office, the Medical Department, and will develop extensive training schemes.

The organisation and Personnel Manager is Mr. E. Ceanat, who was seconded to C.I.E. from the Department of Finance

last December. Under the new organisation the Secretary, Mr. M. J. Hayes takes responsibility for the Legal Department.

It is expected that the practical details of the scheme will take some months to iron out, but it is planned to have the new organisation functioning effectively by the end of 1960.

The Road-and-Rail Transport Problem

THE main thesis of the paper " Economics of Transport " presented last week by Sir Reginald Wilson, Member of the British Transport Commission and Chairman of the Eastern Area Board, to the engineering and geography sections of the British Association for the Advancement of Science at York, is that a new approach is needed to the problem of road and rail transport in Britain. An efficient and economical system of transport, he states, is like Salvation: all are in favour of it, but few are ready yet to accept the discipline and ideas which alone can ensure it. The paper is exhaustive, closely-argued and well-documented, and only a few of its many points can be dealt with here.

The true economics of the road-rail question, he maintains, lie beneath the surface. Neither unrestricted competition nor nationalisation with arbitrary dictatorship over all forms of transport, is a solution. Nor is it necessary now to encourage cut-throat competition between the public, and especially the public passenger, carriers. The social costs of the forms of transport must be considered.

The benefits of privately-owned transport, and more particularly of the rapidly increasing number of private motorcars and " C "-licence road goods vehicles, are at present obvious to individual people and firms. But the social benefits of preserving a due measure of public transport, road and rail, are enormous, though one can assess them only by imagining the situation if there were no such transport. There are many areas in Britain with its crowded roads and many population centres, where traffic would not get through, physically, unless carried collectively by train or bus. The magnitude of the problem is shown in the amount planned to be spent on satisfaction of the ever-growing demand for better transport facilities in Britain, and especially for personal transport. The community, he states, must expect to have to invest sums amounting to £7,500,000,000 for the expansion and improvement of road and rail transport, excluding current replacement, during the next decade or so. Over 90 per cent is for the roads.

Manpower is a major element in the social cost of providing carrying capacity. Sir Reginald Wilson gives a reminder that the published totals of railway employees include men engaged on building new rolling stock, track maintenance staff, and signalmen. The services, or their equivalents in road transport, given by these men are not provided by the road carrier for himself. Comparable statistics probably never have been worked out. Only one-third of the manpower on British Railways is directly concerned with the moving, marshalling, and terminal working of trains, and a still lower proportion with actual movement. The unit of carrying, or at any rate of hauling, can be 14 to 40 times bigger than the biggest unit ordinarily on the road, and the speed is usually higher.

That the effect of size and speed on the use of carrying-manpower can be fundamental is illustrated by the following table for typical units in passenger service:

	No. of men in crew	Through-out speed m.p.h.	No. of seats	Seat-miles per hr. per man
Locomotive-hauled train:				
8-coach express (excluding restaurant cars, brake vans, and so on)	3	55	470	8,600
Long-distance Pullman	3*	57	212	4,030
4-coach local (steam)	3	20	400	2,670
Electric multiple-unit (10 car)	2	25	960	12,000†
Diesel multiple-unit (twin)	2	30	128	1,920
L.T.E. Underground train (7 car)	2	20	288	2,880†
L.T.E. bus	1‡	11	56	620
Country bus (double decker)	1‡	18	56	1,110
Express motorcoach	1	23	39	900
Private motorcar (outside built-up areas)	1	30-45	4	120-180

* Excluding Pullman attendants, and so on.
† Excludes standing room.
‡ Excluding conductor, who to some extent is comparable with ticket collectors, and so on for rail services.

These are theoretical potentials, in that the employee does not spend all his working time in actual movement, but they afford useful comparisons. The higher the speed or the less the distance the greater the relative amount of time spent at terminal points, and waiting around generally. Sir Reginald Wilson might have drawn attention to some skilful rostering on British Railways, which adds much to staff productivity.

With goods transport, comparisons between road and rail are, as he points out, more difficult. The economics rest on the actual seat-miles achieved per man-year. Averages of seat-miles per year per man of the crew from fairly large groups of services run by various units of the B.T.C. compare as follows: (in millions) locomotive-hauled express 4.5; electric multiple-unit train 10.0; diesel-multiple unit (twin) 1.75; overall average for British Railways (say) 3.5; Underground train (7-car) (seats only) 2.5; London bus (excluding conductor) 1.1; country bus 1.5; and express motorcoach 1.4. In practice the range of performance for trains is very much wider than the range for buses.

Because railways need much more manpower than do road vehicles for marshalling and terminal work, trains are not always the most economical user of manpower. Actual performance will be raised nearer to potential performance when steam traction is eliminated, when smaller and more flexible multiple-units become more general on branch lines, and when minor services and shorter and slower distances are transferred to the road.

Goods traffics are too variable for a reliable computation, as are the sizes of the carrying units and the circumstances of operation. The average figure for British Railways in 1957 was about 1,200,000 ton-miles of capacity provided per man of train crew for the many kinds and sizes of train. But in highly favourable circumstances the figure can be 10 times as big. Even when this is divided by four to allow for shunting and so on, no road haulage vehicle could approach such a performance. The average ratio of 1,200,000 capacity ton-miles is, when cut in four, well within the competitive range of the large road haulage vehicle.

A further comparison in favour of the railways is made by Sir Reginald Wilson in the consumption of fuel oil. An eight-coach express, excluding refreshment cars and brake vans, hauled by a diesel locomotive, with a throughout speed of 55 m.p.h. and seating 470 passengers affords 420 seat-miles per gal. Comparable figures for a rural branch-line multiple-unit train are 30 m.p.h., 128 passengers, and 430 seat-miles per gal., for a long-distance motorcoach 23, 39 and 620; for a country bus 18, 56, and 620; and for a private motorcar 30, 4 and 120.

As to the provision and maintenance of motive power and rolling stock, he gives figures which, because of the much longer life of the railway vehicles, tend to favour the railway. The total cost of an eight-coach express is given as £65,000 for eight coaches, £100,000 for a diesel or £70,000 for an electric locomotive, or £11 per seat-year of life. This compares with £27,000 for a two-car diesel set and £10 per seat-year, £5,000 and 16 years for a long-distance motorcoach, and £5,000 and 7 years for a double-deck bus. For a diesel-hauled goods train he assesses £25,000 for 40 wagons and £100,000 for the locomotive, or £7 per capacity-ton per year for life. For the braked goods train, an increasing feature of British Railways, he takes 30 wagons as a standard, costing £20,000. The lighter locomotive is assessed at £80,000 and the cost per capacity-ton per year of life £11. The corresponding figures for a 16-ton lorry and a 5-ton van are respectively £3,800 and £24 and £1,600 and £32. If, he observes, weight is attached to the factor of obsolescence, most of the railways' passenger stock might be regarded as too expensive. Goods stock remains cheaper than the road vehicle per capacity-ton even if it does not live out its full life. For maintenance the cost is harder to compare, but expenditures on railway rolling stock are high, due partly, perhaps, to the hammering stock receives from the existing type of railway track, in which improvement is under way, and perhaps to the weight of vehicles.

The problem of the track element is dealt with at length. The planning of track is bound up with the planning of many other things, including towns, and questions of road and rail track tend to be indivisible, physically and financially. If, like their road competitors, the railways paid fuel duty instead of the burdens actually falling upon them, they would be £70,000,000 a year better off. If the yield of new and improved facilities by rail were calculated on the basis often used for calculating the return on new roads, the result would be vastly more favourable than the basis of calculation at present being used.

Regarding the allegation that a big " profit " accrues on road

taxation after paying for the road, he explains that existing road and rail systems cannot be costed out on a factual basis. Any estimate must depend on great assumptions about value inherited from the past. The predominant item in the social cost of track is notional. That is one reason why attempts to assess what the roads and the railway tracks are really costing the community, comparatively to each other, have never been satisfactory or successful. Another reason is the imponderables, such as the accident rate. "We do not know, and cannot know within any acceptable margin, the true costs of our existing road and rail systems. By the same token, however, it is not true, or certainly not provable, that an excessive levy is taken from the road user compared with the rail user."

Any exclusive claim by any one carrier to an innate superiority for all purposes in all places is nonsense. It depends on the circumstances, and if the public carriers could be brought to work more together on the basis of their true economics, and if we could obtain an intelligent approach all round to the road-rail question "society would save tens of millions of pounds every month, and incidentally we would reduce congestion on the roads."

No relevant consideration seems to be omitted from the paper, nor can Sir Reginald Wilson be accused of bias. Possibly for that reason *Motor Transport* in its September 11 issue was forced to abuse rather than assessment of the paper, which it said was "a lengthy attempt to advance the cause of rail transport against road transport, and should be recognised as nothing more than propaganda." It is quite clear to anybody who troubles to read it that it is impartial. He is stated to have spent much time re-examining the "hoary old arguments about comparative road and rail costs," which may become "a major plank in railway public relations policy." These matters need constantly to be borne in mind. Basic factors in an argument do not become "hoary" because they remain unchanged both in their importance and incidence. The suggestion in *Motor Transport* that his comparison of road and rail track costs are meaningless because "a public road is for general public purposes, and not only for transport that competes with railways," is fantastic. All the users of the road large enough in any respect to affect comparison with the railways are considered.

LETTERS TO THE EDITOR

(*The Editor is not responsible for opinions of Correspondents*)

Kent Coast Electrification

September 7

SIR,—Mr. R. A. Laurence is right to say, in your issue of August 28, that the re-arrangement of the duplicate up and down tracks through Shortlands means that it is more difficult for passengers having to change platforms quickly when trains get out of sequence, but part of the purpose of the new arrangement was to improve working so as to make it easier to keep trains in sequence. It would, therefore, seem rather pointless to undertake heavy capital expenditure in providing additional footbridges against a situation which we are trying more or less to eliminate.

In fact, since the bringing into use of the new layout, emergencies of this sort have been rare. We realise, however, that there will continue to be some exceptional occasions when train running has to be altered and so we are considering the provision of loudspeaker equipment at Shortlands to give early warning to passengers waiting on the platform. Meanwhile we are providing a "trans-hailer" for that purpose.

I agree that during the engineering work in the Shortlands area we omitted to plaster the station with notices and descriptions of the alterations. Instead we used neat but compelling posters to invite passengers to ask for a copy of the news sheet specially published for this purpose. For a full description of the work, together with diagrams and explanation in the simplest terms, I refer Mr. Laurence to issue No. 5 of that news-sheet (the "South East Report", which has been referred to in your editorial columns).

Yours faithfully,

F. D. Y. FAULKNER
Public Relations Officer

British Railways, Southern Region, Waterloo Station, S.E.1.

Design of Passenger Coach Bogies

July 26

SIR,—I refer to the letter from Mr. H. E. Norman, published in your May 15 issue, in which he commented upon the editorial article in your April 17 issue, on the paper which I recently read to the Institution of Locomotive Engineers.

I am happy to inform Mr. Norman that I did not need or use the "fancy electronic computers," to which he refers, in arriving at the conclusions contained in the paper. These were in fact reached as a result of experience gained from the very close degree of co-operation which has existed between the Chief Mechanical & Electrical Engineer's and Chief Civil Engineer's Departments of British Railways, Western Region, for many years, where one department systematically runs for the other a special coach so as to assess the state of main-line track according to the vehicle reaction effects produced. There is, however, a very decided place for electronic computers in this field, and practical experience has led me to propose additional electronic means whereby it may be possible in the future to assess the safety-of-riding factor for any route in terms of the predicted forces of reaction of the rolling stock intended to use it.

If Mr. Norman has the opportunity to read my paper, he will find that I do not in fact blame the track entirely for bad riding, but make it quite clear that bogie design must be related to track conditions. Proper design, whether arrived at by chance or by logical approach, can avoid the unpleasant transference of track effects to the vehicle body. For example, as long a suspension link as possible is recommended so as to reduce response and transmission of sideways shocks. This is basically the reason why a double bolster suspension is so successful in this respect, and explains why the bogie to which Mr. Norman refers and also the B.R. Standard Bogie (when new, and as confirmed by recent trials on the Continent) ride so well.

For the same reason, a single bolster, or shorter link, cannot provide such a good lateral ride as a double bolster, all other factors being equal. By fitting frictionless or "rocking washer" suspension links, however, and dissipating transmitted energy by hydraulic shock absorbers it is possible to improve the riding of single bolster bogies considerably. Similarly, such measures which include the elimination of solid friction from the suspension, the use of hydraulic shock absorbers and the variability of their characteristics, the reduction of the coning angle, positive guiding of axles, with other means as yet untried, can all contribute towards producing bogies which will give a ride better if possible than existing double bolster suspension, but without the detrimental effects which occur as wear increases.

Obviously loose brakegear is undesirable, but cannot conceivably cause hunting. It has been found, however, that too rigid a location of a brake block can result in grooved wear of the tyre tread.

Incidentally, I would have considered the introduction of long welded rails as an additional major change which is taking place in the design of track, and which should assist in producing a more comfortable vertical ride and reduce purely track joint maintenance. The maintenance and improvement of the three principal dimensions of track shape, *i.e.*, crosslevel top, and particularly alignment, so that they are as free as possible from disturbing variations, will, however, continue to provide the Chief Civil Engineer's Department with a continuous task, the skill of which is not often appreciated.

Yours faithfully,

R. M. HANCOCK,
Wh. Sc., A.M.I.Mech.E., A.M.I. Loco E., A.F.P.W.I.

83, Reids Piece, Purton, Wilts.

THE SCRAP HEAP

Quiet as a Mouse at 55 Broadway

Tommy Bartram, elder brother of the big-game hunter in East Africa, was hot on a safari himself. The 28-year-old construction engineer, working in the design office of London Transport, was disturbed by a mouse. . . . "It ran round the office and over the drawing boards . . . up the skirting, round the tables and under our feet," he said. "I set out after it armed with a set-square, but it constantly evaded me." Tommy did not shame his brother in the field. The mouse was bagged in 6 min. dead.—*From the "Daily Sketch."*

Church by Rail

A railway station which formerly stood a few miles from Sydney has recently been demolished, stone by stone, and is being re-erected as a church in the Australian Capital Territory of Canberra, 200 miles away. This was the mortuary station in the Rockwood Cemetery grounds, which was served by a special branch from the main western suburban line near Lidcombe. It was built in the 1860s to cater for funeral trains from Sydney, and consisted of two 100-ft. platforms on either side of a single track, part of which was covered by the station building.

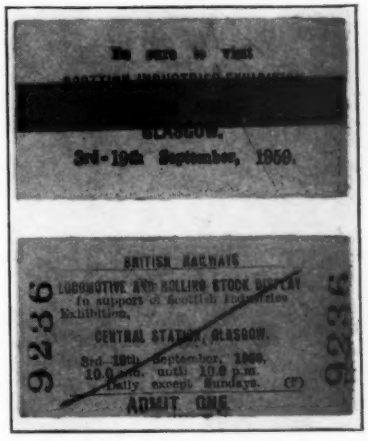
The date 1868 was carved on a belfry, which formed part of the main structure, and from which a bell was rung to recall passengers in the cemetery grounds for the return journey. The great arch comprising the entrance to the station for trains was guarded by two stone angels. Funeral trains were first shown in the public timetables of 1867, and were run with great decorum, no speeding or whistling being permitted.

The advent of the modern motor funeral spelt the death knell of the line, which was finally closed in 1948. Some time later fire destroyed the roof and interior of the station, but the Gothic arches, Corinthian columns and delicately carved angels still retained much of their beauty. When tenders were finally called for its sale and demolition this curious old railway station was bought by the Church of England authorities from the New South Wales Railways, and is to become the Parish Church of All Saints at Ainslie, a suburb of Canberra. There is still an unstaffed platform named Rockwood on the main western line near the cemetery, but not many trains stop there.

Pre-Grouping Liveries in Scotland Again

Locomotives of four of the five former Scottish railways and of the former Great Western Railway, have returned to service in their company liveries. In connection with the Scottish Industries Exhibition being held in the Kelvin Hall, Glasgow, until September 19, they are double-heading about one-half of the 60 excursion trains run by British Railways, Scottish Region, to and from Kelvin Hall Station or Glasgow Central. The four Scottish engines are Caledonian Railway 4-2-2 No. 123; 4-4-0; No. 49, *Gordon Highlander*, of the Great North of Scotland; a Jones 4-6-0 goods engine, No. 103, of the Highland; and 4-4-0 No. 256, *Glen Douglas*, of the North British Railway. The visitor from the South is G.W.R. 4-4-0 *City of Truro*, reported to have achieved 102 m.p.h. in 1904. Workings by these historic locomotives scheduled for this week included return trips on September 16 from Aberdeen to Glasgow Central of *City of Truro* assisted by *Glen Douglas*, and from Edinburgh Princes Street to Kelvin Hall of *Gordon Highlander* assisted by C.R. No. 123.

The display of locomotives and rolling stock, which, as recorded last week, is being held in Glasgow Central Station in support of the exhibition, is open daily from 10 a.m. to 10 p.m. It includes one of the electric trains which will be in service between Helensburgh and Airdrie next year, also new passenger and freight vehicles, the British Railways model railway, and a cinema coach. A half-hourly diesel train service is being run between Glasgow Central Low Level and Kelvin Hall, near the Scottish Industries Exhibition.



Ticket of admission to rolling stock display at Glasgow Central

Train-Inspired Music

Music for the *son et lumière* production "This Tower My Prison," at Greys Court, near Henley, was composed by Denis Matthews. . . . Inspiration wouldn't come. Then the railways took a hand. Matthews went to Aberdeen for a concert and on the way back to London set to work in his swaying coach, with the clickety-clack of the wheels beneath him. The whole piece—it lasts for half an hour before the show starts—was finished when the train got to London—*From the "News Chronicle."*

Perfumed Platforms

(*See our June* 26—*August* 14 *issue*)

Not for the first time Gay Paree
Has led the way in such
Extravaganzas as may be
Born of its lighter touch.
Now, it would seem *chemins-de-fer*,
With Gallic effervescence,
Will fill their *gares* with perfumes rare
And aromatic essence.
And *autres temps* and *autres moeurs*,
Subjects of apt quotations,
Must now give way to "Quelques Fleurs"
When used in railway stations.
The Metro started all this lark,
For travellers intent
On getting somewhere in the dark
To find their way by scent.
Ah, well, let Gallic fancy roam
According to its wish,
I still will feel much more at home
With creosote and fish.

A.B.

Photo] [*Guy Bakewell*

Remains of the old station in the Rockwood Cemetery, near Sydney

OVERSEAS RAILWAY AFFAIRS

(*From our correspondents*)

INDIA

Survey for Another Ganges Bridge

The Deputy Railway Minister stated that as a result of a recent reconnaissance survey, detailed investigations into the local conditions and behaviour of the River Ganges in the neighbourhood of Ghazipur were now being carried out. These were preliminaries to the possible construction of another bridge over that river at a point about 140 miles, as the crow flies, upstream from the recently-completed Mokameh Bridge, and about 40 miles east of Banaras. As the Ganges is bridged at the latter city it would be interesting to know how another costly bridge so near at hand is financially justifiable.

Increased Penalties for Offences

Obstruction of railway servants in the discharge of their duties, wanton alarm chain pulling, and certain other anti-social offences which hamper the smooth working of the railways have now become punishable with imprisonment or fine or both. A Bill passed by Parliament became law on May 2, 1959. The Railway Board has directed all railway managements to take action to implement the new provisions.

For persons obstructing railway servants in the discharge of their duties, the punishment has been increased to imprisonment up to six months or fine up to Rs 500 (£38) or both. The railway authorities may now arrest without warrant persons indulging in offences relating to alarm chain pulling and to travel without a proper ticket or a pass with intention to defraud. The penalty for pulling the alarm chain without reasonable cause has been raised from a fine of Rs 50 to imprisonment up to three months or a fine of Rs 250 or both. In the case of habitual ticketless travellers courts have power to ask an offender to execute a bond for good behaviour, with or without sureties. The unauthorised occupation of a berth or a seat reserved for another has been made punishable, with powers to the railway administrations to remove the unauthorised passenger from the reserved compartment, seat or berth. The amended Act prescribes a fine of up to Rs 250 (£19) for unauthorised hawking or sale of any article on railway premises.

NEW ZEALAND

Milson Deviation Line Opened

Completion of the first stage of the Milson Railway Deviation project at Palmerston North was marked by a ceremony at Longburn, four miles south of the city, on July 27.

The deviation, which ultimately will carry the main line through Palmerston North, is approximately 7½ miles long. The single track that has now been laid forms an avoiding line for at least two through goods trains daily. It is also used by shunting services conveying wagons to and from the goods delivery sidings at Milson, near the site where a new goods yard and marshalling yard are to be constructed. The new line replaces the two-mile Milson Industrial Branch that linked these sidings with the main line.

The transfer of through goods trains to the new line will relieve congestion in the present inadequate station yard at Palmerston North, and will reduce the number of trains that pass daily through the Square and over a number of level crossings in the heart of the city.

Train movements over the new line are controlled by a C.T.C. installation operated from Palmerston North. This equipment also covers a new crossing loop at Roslyn, where the new line converges with the old, and replaces tablet working between Palmerston North and Bunnythorpe, the next station beyond Roslyn.

Warning lights and bells have been installed at all level crossings on the new line. Most of these crossings will eventually be replaced by overbridges, and work on two of these overbridges is expected to start this year.

Foxton Branch Closed

The Foxton branch line has been closed because it was unremunerative. The branch, 19 miles long, linked Foxton, on the west coast, with Longburn Junction, on the North Island main line, three miles south of Palmerston North.

VICTORIA

Diesel-Electric Locomotives

The first of ten 950-h.p. general purpose Class "T" diesel-electric locomotives, ordered from the Clyde Engineering Company, New South Wales, went into revenue earning service at the end of June.

The ten locomotives, which are of modified design, will supplement the existing fleet of 27 Class "T" locomotives which have registered some 4,000,000 miles since the first went into service in August, 1955. The modifications include a shorter underframe to reduce the axle load, redesigned engine with a special balancing unit to remove vibration, new design of traction motors to reduce maintenance, and improved driving cab layout.

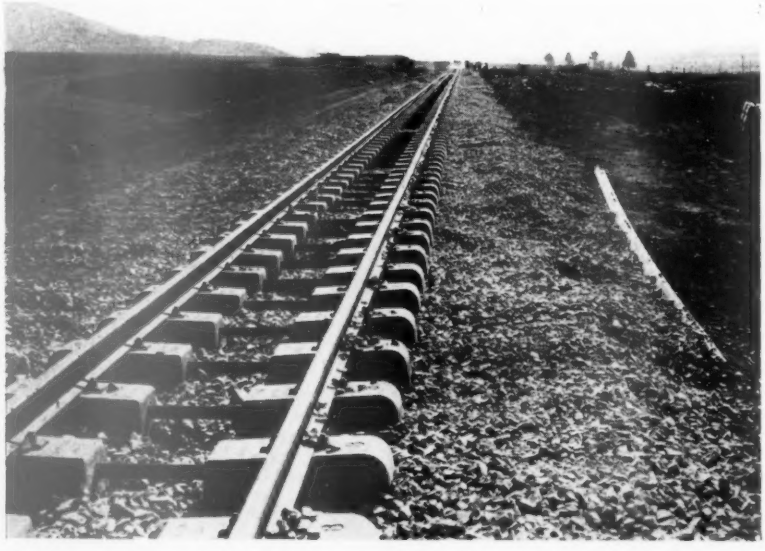
The new locomotives cost £72,000 each and are expected to run an average of 50,000 miles a year. Deliveries will be made every three weeks, with the last locomotive going into service in January 1960.

SOUTH AFRICA

Concrete Sleepers

One million concrete sleepers are to be supplied over the next 2½ years. Orders have already been placed for 311,000, of which about half have been delivered and are being laid in conjunction with major new works in hand. Sleepers are made locally from South African materials. Their useful life is expected to be at least 40 years, against an average of 25-30 years for steel, and 15-20 years for wooden, sleepers.

Because of its greater weight the concrete sleeper is more difficult to handle and align, but this is considered by the S.A.R. management compensated for by its maintaining line and level more effectively, especially when used in conjunction with the long-welded rails now being used in lengths of up to half-a-mile. While the experimental stage can now be regarded as over as far as the possible introduction of these sleepers into general use is concerned, experiments are still continuing to determine



Concrete sleepers laid with long-welded rails, South African Railways

the best type of fitting on which to standardise for South African conditions. Special attention is being paid to sharp curves, to the requirements of long-welded rails which are being used more and more extensively, and to insulation required for C.T.C.

CANADA

C.N.R. Wins Safety Award

Canadian National Railways, for the second consecutive year, has been named a winner of the annual Public Safety Activities award, presented by the National Safety Council of the United States. C.N.R. is one of only 16 railways in North America to be awarded this honour, and won similar awards in 1954 and 1958. The National Safety Council is a national and international clearing house for the gathering and distribution of information on causes of accidents and ways to prevent them. Awards are given annually to encourage industry to support the safety effort. This is the fifth year in which Public Safety Activities awards have been presented.

Safety at Level Crossings

The Board of Transport Commissioners has called on the railways to fit reflecting devices, of a type to be approved by it, to the sides of all box-type freight vehicles purchased after May 1, 1959 up to the end of 1960, and an equal number of vehicles already in service. The two principal lines, Canadian National and Canadian Pacific purchase some 6,100 annually. The object is to reduce the number of accidents arising at level crossings from road vehicle drivers carelessly running into the sides of trains. Eighty per cent of the cost of the plan will be borne by the Government from the fund used hitherto to help finance the elimination of " grade " crossings. Such payments were sanctioned by legislation enacted in 1958. It is well known, however, that many collisions occur where there are flashing lights or other efficient forms of warning, and if such go unheeded it is not likely that reflectors will prove any more efficacious. As pointed out by the President of the C.N.R., Mr. Donald Gordon, numerous U.S.A. freight wagons operate in Canada, and would remain unaffected by these new requirements. During the last nine years out of 1,450 crossing accidents occurring in darkness 973 involved casualties. Nearly 130,000 vehicles are involved but the intention would be to proceed prudently with the scheme and ascertain how it works over the next two or three years.

PORTUGAL

Improved Frontier Station Accommodation

The growth of the traffic, particularly of the tourist type, passing through the frontier station of Vilar Formoso, on the line connecting Salamanca in Spain with the main line through Castelo-Branco to Lisbon, has led the Portuguese Ministry of Public Works to improve greatly the accommodation for the customs, passport and associated staff, for some time known to be very insufficient and occasioning much delay. Road traffic is now separated from rail in these respects and every endeavour has been made to give a pleasing appearance to the new buildings, which have been designed and decorated with the aid of well-known architects and artists, and thus favourably impress the traveller on entering the country. Postal, information, and restaurant services have been given new and spacious accommodation. Similar improvements are to be commenced at the northern frontier station of Valenca do Minho, where the line coming from Corunna in Spain through Pontevedra connects with the main line southwards to Oporto.

FRANCE

Valence-Avignon Electrification

The electrification of the 78 mile Valence-Avignon section of the line between Paris and the Riviera will be completed in time for all expresses using this line to be electrically hauled between Paris and Avignon, a distance of 461 miles when winter timetables are introduced on October 4.

The electrification of this section of line will make possible a considerable degree of acceleration on overall timings of main line expresses between Paris and Marseille or Vintimille. The acceleration of the " Mistral " by 15 min. means that this express will cover the 78 miles between Valence and Avignon at an average of 78 m.p.h. instead of 62½ m.p.h. as at present, the 536 miles between Paris and Marseille in approximately 7½ hr. at an average of 71 m.p.h., and the 676 miles between Paris and Nice in approximately 10½ hr. at an average of 64½ m.p.h.

Publications Received

The History of Wagons-Lits 1875-1955. By George Behrend. London : Modern Transport Publishing Co. Ltd., Russell Court, 3-16, Woburn Place, W.C.1. 9¼ in. by 7 in. 32 pp. Paper covers. Illustrated. Price 3s. 6d.—A great deal of information on the past history and present activities of the Cie. Internationale des Wagons-Lits is pleasantly and concisely presented. Some diverting incidents are well described. The historical facts assembled make this book a corpus of information on the development of railway passenger travel in many countries which is probably unique in the English language, and particulars given of Wagons-Lits rolling stock and services today and in recent years are of considerable value for reference purposes. The photographs and old engravings are well chosen and reproduced.

S.T.C. News Bulletin.—The current issue of the Standard Telephones & Cables Limited *News Bulletin* contains an article on railway power supplies. Details are given of the equipment manufactured by the firm for the remote control and supervision of power supplies for the trial section of 25kV. a.c. electrification on the Colchester-Clacton-Walton lines of British Railways, Eastern Region. A brief description also is given of the power feeder and switching system. There are illustrations of a supervisory remote control panel and telephone key panel, a control station apparatus cubicle, and out-station apparatus cubicles. A sketch map shows the Eastern Region lines out from Liverpool Street and Fenchurch Street to be electrified or converted from d.c. operation, and the location of track sectioning cabins, control rooms, and feeder stations. Copies may be obtained from Standard Telephones & Cables Limited, Connaught House, Aldwych, London, W.C.2.

Metallic Steel Conduits and Fittings.—A 41-page catalogue and price list of steel conduits, conduit fittings, and accessories, published by the Metallic Seamless Tube Co. Ltd., is intended as a day-to-day reference book for those concerned with planning electrical installation work. The permissible wiring capacity of all types and sizes of conduit up to 2-in. bore is shown in the front of the catalogue by means of a tabulated extract from building-equipment regulations of the Institution of Electrical Engineers. This is followed by lists showing the available sizes of light- and heavy-gauge screwed and socketed conduit. Types of conduit in the list are close-jointed, plain-welded, solid-drawn, oval-close-jointed, and oval-plain-welded. All are available finished by either stove enamelling, hot galvanising, or Sherardizing. Each list is accompanied by a table of weights and leading dimensions. There are clear illustrations of bends, couplings, elbows, tees, and junction boxes. These fittings and other accessories and tools are individually priced. Copies may be obtained from the Metallic Seamless Tube Co. Ltd., Ludgate Hill, Birmingham.

Free Space Hydraulic Couplings and Drives.—A leaflet produced by Crofts (Engineers) Limited, gives dimensional and performance data on FSC direct couplings for shafts, and FSP pulley, chain sprocket, and spur-gear drives, all incorporating automatic hydraulic couplings to provide shockless acceleration and cushioned running. The method of operation by hydrokinetic energy transfer is fully explained and the construction and methods of installation are shown by means of sectional drawings. Advantages claimed include the use of smaller and cheaper motors and starters, overload protection for both prime mover and driven machinery, and longer machinery life. Sizes are listed from ¾ to 300 h.p. to suit most 50 and 60 cycle motor speeds. Copies may be obtained from Crofts (Engineers), Limited, Bradford 3, Yorkshire.

B.T.C. Signal Development Centre at Leyton

An inter-regional service for the solution of signalling problems

Prefabricated timber building, designed by the Architect of the Eastern Region

THE purpose of the Signal Development Centre recently established by the British Transport Commission at Leyton, Essex, is the solution of signalling problems occurring on all Regions of British Railways. Single and centralised, it avoids duplication of work and unnecessary regional expense.

An example of its work is that connected with railbuses. Because of the light weight of these vehicles, they cannot be relied on to operate track circuits and the centre is investigating these difficulties. Development work on automatic warning control is a further example, embracing not only track equipment but development of a.w.c. apparatus for use in locomotives and multiple-unit trains.

The centre comprises essentially a laboratory, in which experiments can be conducted on all types of electrical signalling apparatus. It is well equipped with highly sensitive instruments. A wide range of electric power supplies makes possible the similation of any condition met with in signal-boxes or line side locations.

A compact machine shop is available, in which special pieces of equipment, required in small numbers for research work, can be produced. A dark-room is provided for processing photographic records. In addition there is office accommodation, stores and the usual domestic rooms.

Laboratory Equipment

The principal items of equipment in the laboratory include two oscilloscopes, Cossor Types 1049 and 1052, and an oscilloscope film-recording camera. In addition there is a 12-pen recording instrument, a stroboflash, an electric chronotron, various meggers and many types of electrical meters, including a valve voltmeter. Specialised electronic test gear is often built by the laboratory staff to suit its problems. A specially-designed bench with a laminated plastic top, runs round three walls of the laboratory. The machine room is to be equipped with a 3½-in. lathe, sensitive drills, a small press, bending machine, tool-room shaper, and the usual range of hand tools. An ordinary mains supply is available, also a 110 V. a.c. signalling supply and battery-fed d.c. supply. Compressed air and vacuum are provided by a compressor and exhauster.

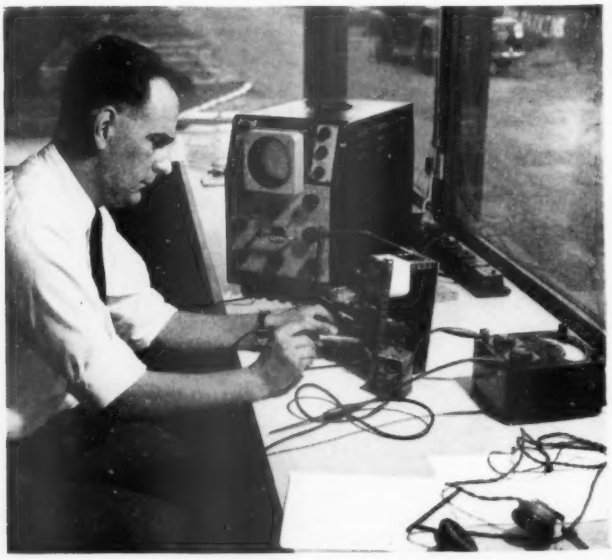
The building is of single-storey prefabricated timber construction, designed in the office of Mr. H. H. Powell, Regional Architect, under the general direction of the Mr. A. K. Terris, Chief Civil Engineer, Eastern Region, British Railways. It was erected within three months, and requires minimum maintenance. The prefabricated timber walls can be altered, extended or removed as requirements dictate. In the event of the building being demolished, about 90 per cent of the material will be recoverable. Most of the rest of the building is also prefabricated.

Experimentally, the exterior hardwood surfaces have been left unvarnished, as varnish is not entirely satisfactory in constructions of this type. Internal partitions have softwood frames and plaster-board cladding, with hard-wood cover-moulds. The wall panels are filled with black vitreous steel sheet or glass, enamelled and insulated.

The roof box-beams are of laminated timber. at 3 ft. 3 in. centres. Tongue-and-

(*Continued on page* 174)

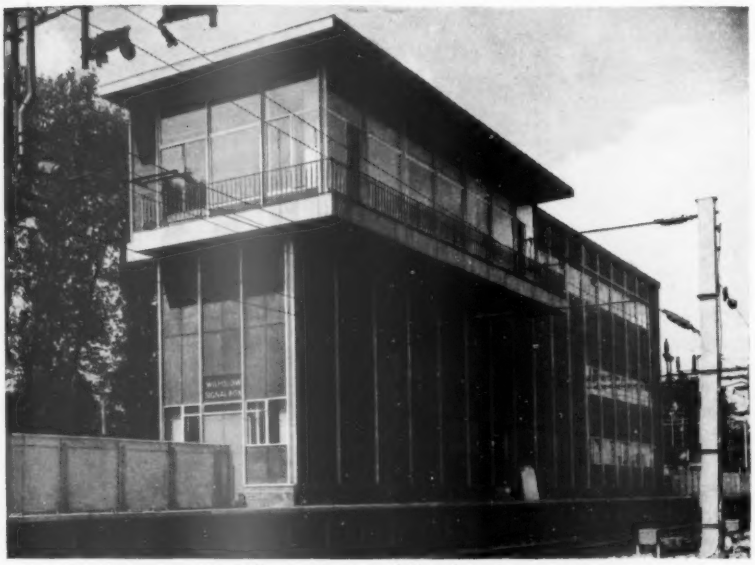
Interior of building, showing entrance to the laboratory



Development work taking place in the laboratory

Signalling for Crewe-Manchester Electrification

Remote control over intermediate locations from new panel signalboxes at Sandbach and Wilmslow



Wilmslow signalbox, showing fully glazed operating room

THE decision to electrify the British Railways, London Midland Region, main line from London (Euston) to Manchester and Liverpool on the 25-kV. 50-cycle a.c. system necessarily involved not only the question of providing improved signalling to enable the new services to be operated to maximum advantage, accompanied by appreciable savings in operating costs, but also that of protecting the equipment—including such of that already in service which it might prove advisable to retain—against unwished-for influence from the traction system, especially anything which might tend to affect it from the safety point of view.

Most of the apparatus dated back many years and was spread among many signalboxes. The adoption of modern methods offered the possibility of eliminating eventually many of these and concentrating the direction of the train running in comparatively few, located at selected key points and exercising supervision over a wide area by remote control. Power signalling was already in service at certain stations but, with the exception of the terminus at Euston, completely re-signalled in 1952, and on the local electrified lines to Watford, was not generally of very modern design and had been installed before there was any question of working the main lines electrically, by whatever system. In addition to the signalling the telecommunications system needed improving to afford greatly increased facilities, while itself requiring in turn to be protected adequately against external influence.

The great importance of the numerous and at times rather complicated issues involved led the British Transport Commission to decide to electrify, as a first stage, the line from Crewe to Manchester via Styal and later via Stockport, and to use a part of the route as early as possible for obtaining vital information on certain problems connected with 25-kV. traction, in continuation of what had been done on the Morecambe-Heysham line. Some particulars of the civil engineering and overhead equipment construction on the Styal line between Wilmslow and Slade Lane Junction were given in our issue of November 7, 1957. This route is now being used for staff training purposes but as yet no public services are being operated over it electrically.

Signalling Arrangements

Colour-light signalling controlled by continuous track circuiting, with A.T.C. ground equipment, has been or will be installed on all running lines. (On the single line section from Sandbach to Middlewich, on the connecting line to Northwich, which is of some length, axle counting is being used to cover a certain distance.) Electric power signalling of the Webb-Thompson type was installed at and close to Crewe Station early in this century and in 1940 the two large North and South boxes were replaced by new ones containing electrically-locked lever frames, to the accompaniment of other improvements such as new point machines, colour-light signals and so on, but without effecting any material change in the working itself, or the layout. Two small boxes inside the station were retained, but one has now been abolished and the other will be in due course.

North of Crewe, as far as Gatley on the Styal line and Cheadle Hulme on the route to Stockport, over a distance of some 27 route miles, the working is now controlled entirely from two signalboxes, at Sandbach and Wilmslow; formerly there were 14 on this section. Those, for example, at Goostrey, and Chelford Goods remain in the form of shunting frames, electrically controlled, while at Alderley Edge, Chelford Station, Sydney Bridge, and Handforth Sidings, remotely controlled relay interlocking apparatus rooms have been provided. Other signalboxes have been eliminated or replaced by ground frames, as at Holmes

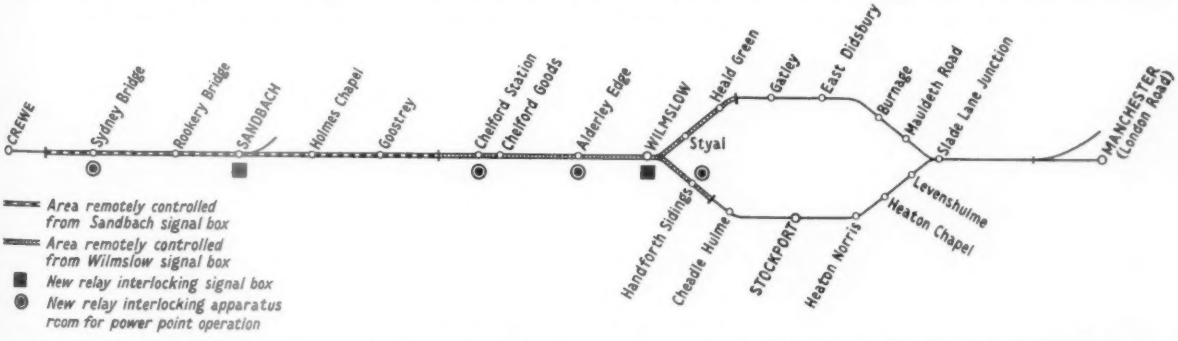
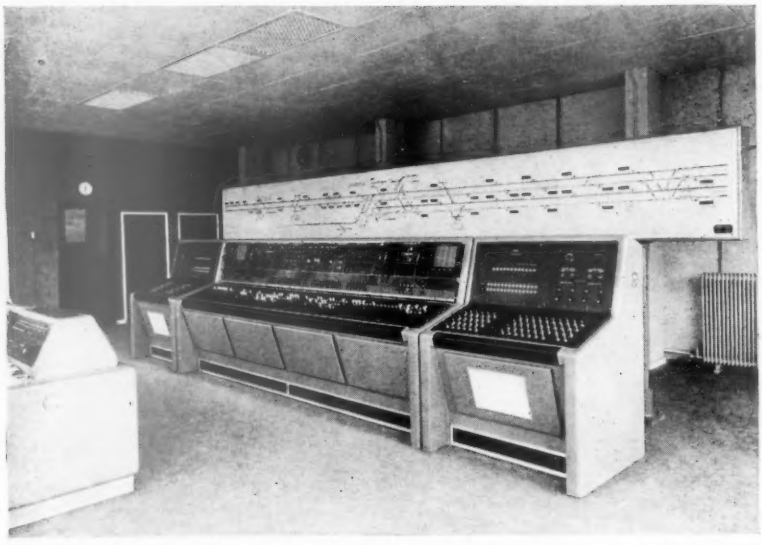


Diagram showing new remote-control working brought into service on Crewe-Manchester line, London Midland Region



Interior of Sandbach signalbox, showing operating console with telephone and train describer equipment and track diagram

Chapel. The new arrangements are shown on the diagram on page 171. (At Alderley Edge, where certain trains terminate, a small point operating panel, controlling electro - pneumatic mechanisms has been installed to deal in emergencies with such movements.)

Sandbach box now controls the whole of the line from a point just north of Crewe (Salop Goods Junction) to a point between Goostrey and Chelford; it also operates directly the two double cross-over junctions at Sydney Bridge, a short way out of Crewe. Thence to a point just south of Gatley, on the Styal line, and near Cheadle Hulme on the Stockport line, the working is regulated entirely from Wilmslow. No box now exists at Gatley or Burnage stations, while the ground frames at East Didsbury and Mauldeth Road are electrically released from Slade Lane Junction, where the routes diverging at Wilmslow rejoin. (On the Stockport line colour-light signalling has been in use between that place and Levenshulme since 1955, and has now been extended to Slade Lane Junction; the existing signal-boxes, except Levenshulme North, have been retained for the present but a new power box is to be erected at Stockport and eventually will control the entire section.)

Transposition of Lines

From Slade Lane Junction to Manchester the four tracks which before grouping belonged to the L.N.W.R. and which, near the terminus, come alongside the former G.C.R. lines, were arranged originally for " parallel " working. This was found increasingly to interfere with satisfactory working of the station itself and during the week-end of November 15-16, 1958, the lines were altered to " alternate," up and down, with corresponding re-modelling of the connections and signalling at London Road and Slade Lane Junction; at the latter the lines coming from Stockport through Levenshulme remain arranged on the " parallel " system, but all running signals have been converted to colour-lights and the points equipped with electro - pneumatic mechanisms, operated from a relay interlocking panel in the original signalbox.

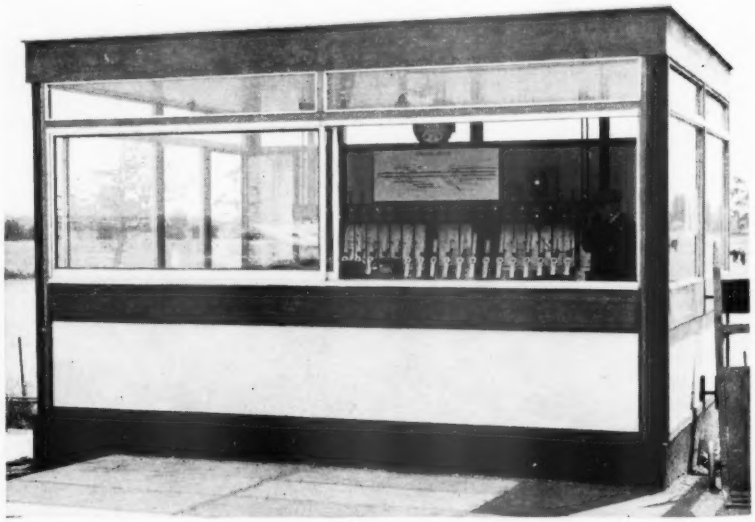
It is intended to transfer this equipment to a relay room, panel included, and control the working normally from London Road when that terminus is re-signalled. Five mechanical signal-boxes also had to be altered in connection with this transposition of lines. At London Road the west side of the station is controlled by a " Crewe " type all-electric signalbox and the east, or former G.C.R. side, now Eastern Region, by an electro-pneumatic one. (This was all-pneumatic when opened in 1909.) Their equipment is now out of date and the entire working is in course of being concentrated in a modern relay type box, to come into service next year.

The Sandbach and Wilmslow boxes have route-setting panels, on the one switch per route system, with the usual illuminated diagrams behind the switch desks and telephone and describing equipment conveniently arranged. Train descriptions on receipt appear as illuminated four-digit signs, indicating class and destination, etc., given by optical projection in openings on the track diagram, from signal to signal, and moving along as the train concerned advances, by track circuit control. Provision for interposition is given and the usual storage facilities. Not only is the occupancy of a track circuit shown, but the signalman is made aware what train is standing on or running through it.

Remote Control

The remote control is a high-speed system designed to transmit, by codes of carrier frequency, impulses sent over a pair of line wires, a large number of controls and indications between two fixed points. By using additional carrier frequencies or line wires it becomes possible to control a number of remote locations from a central point.

Fundamentally, the system comprises two synchronously operating counting chains, one at the central point and the other at the field location; the number of steps in these equals the number of two-position devices to be controlled or the number of functions to be indicated, whichever is the greater. Two frequencies are used for controls, the appropriate one being selected for transmission, on any given step, by the position of the switch or button associated with it. In the case of indications the frequency to be sent to the central point is determined by the condition of the relevant device. No " start " button is used. It suffices for the signalman to actuate the relevant thumb-switch or



Electrically released shunting frame at Chelford Station for control of local movements under permission from main signalbox at Wilmslow

button and the fresh instruction thus set up is sent out at once.

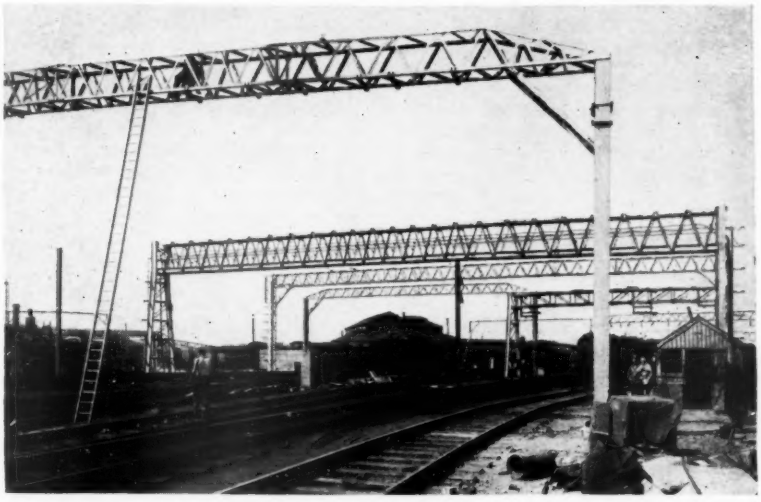
A change in the condition of a function—points, signal, etc.—at the remote location is similarly notified immediately to the central point. All stepping, counting, chain actions, and intermediate registry functions are carried out by transistors; relays are used solely for the final stick registry and form the only moving parts in the system. The use of transistors permits of continuous "scanning," which means that counting chain cycles—complete codes—are being consecutively and continuously generated. Very high speed operation is thereby attained and there would be no difficulty in performing 500 controls in one second, with allowance for final relay operation or release. The transistorised transmitter and receiver units are extremely compact. Arrangements are incorporated in this equipment by which the signalman at Sandbach or Wilmslow can place any of the automatic signals to danger in emergency.

Signals and Points

Running signals are multi-lens, three or four-aspect, as spacing and braking distances require, with junction indicators where necessary. Close-up indications are given by deflecting inserts in the lenses and no sidelight is used. Shunt and subsidiary signals are generally position lights but a few flood-lit mechanically worked signals are seen here and there. Power for the 12V. 24/24 W. triple-pole signal lamps comes from the local signalling supply, transformed and rectified at each location, but the red aspects are maintained in the event of a total failure of power by a "Nife" battery stand-by at each signal. To prevent any indirect or induced effect from the a.c. traction system illuminating a signal irregularly its 24-V. d.c. control relay, itself immune to a.c. operation up to 1,000 V., is located immediately alongside.

The signal structures, efficiently bonded to earth, are separate from the traction supports and their wiring; weldmesh guards protect anyone working on a signal when the traction conductor is less than 9 ft. distant. Points, where power operated, are electro-pneumatic, without ground track locks, with 24-V. d.c. control valves, also immunised to a.c. up to 1,000 V. All signalling line and point detection circuits are (*a*) fed from a completely insulated supply, without earth; (*b*) of the two-wire double interruption type; (*c*) divided into 1,000 to 1,350 yd. lengths, according to the distance from the sub-station, to limit longitudinal induced voltage to 430 V. under any traction fault and the normal induced voltage to 60; (*d*) run in multi-core cable with non-metallic sheath, and (*e*) use 24-V. d.c. immunised relays.

Where ordinary lever and ground frames remain they are fully earthed; point rodding is insulated on the track side of the lead-away and at all the points, also intermediately if the rodding exceeds a certain length. Signal wire also is insulated clear of the lead-away on the signal side of the box and intermediately over a certain distance.



Signalling and telecommunication cables being carried over line on special structure, second from front, to avoid use of traction wire standard

Plug-in relays are used in signalboxes, relay rooms and at lineside locations; track circuit relays, however, are of the shelf mounted type. Up to 500 yd. track circuits are d.c. single-rail with rectifier feed; each feed unit is protected against the a.c. return traction current becoming rectified and fed back to the rails as d.c., while the special d.c. track relays are immunised to a.c. and can withstand considerable a.c. voltage without impairment of their d.c. characteristics. Circuits over 500 yd. long are double-rail, fed at 75 cycles and have special impedance bonds.

The 75-cycle current is derived from a 50- to 75-cycle converter at each circuit; the figure of 75 was selected for the track circuit as being most conveniently obtained by static means from the 50-cycle signalling supply and at the same time not being a harmonic of the traction frequency. At the relay end the track circuit current is fed through a frequency discriminator and rectifier to a standard d.c. relay. No internal fault in the discriminator can result in 50-cycle current passing to the relay and operating it irregularly.

Four-aspect colour-light running signal fitted with protective screen, because of proximity of high-voltage traction wire

Power Supplies

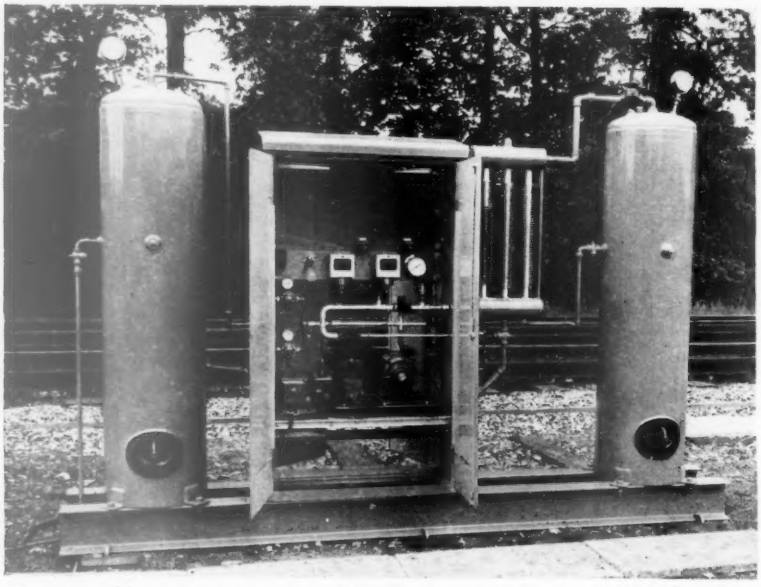
Power is taken from the local authority at 415 V., 50 cycles, and led into equipment rooms at selected locations, with a transportable standby generating set at each, started automatically in case of mains failure and taking over the load in 7 sec., but when the traction power supply becomes permanently available this will be used as the standby and the diesel sets will be withdrawn and used elsewhere. Local authority and traction supplies will be taken from different parts of the Grid and for the Styal line the latter will normally come direct from Heaton Norris. Should this fail from a fault on the Grid system the Chief Mechanical & Electrical Engineer's emergency feed arrangements will be brought into operation by the Crewe Electrical Control Room and, after a brief interruption, power will become fed out from Crewe over the traction wiring system.

Gradually, as the main line electrification proceeds, other alternative arrangements will become available. The chances of a Grid breakdown interrupting the traction supply in the Manchester area for more than a few minutes are very remote, as it would have to be so extensive as to involve two others. Even then traction current could still be obtained from other parts of the Grid, but time would be involved in isolating the fault and effecting the necessary switching.

A 650-V. distributor runs from each equipment room, with step-down transformers at outside and relay interlocking locations. The distributors have double-wound transformers at intervals, to

limit induced voltage in the feeder cables. (Slade Lane Junction Signalbox is fed from an existing distribution system via Heaton Norris, with its own diesel standby.)

Air for the more important locations where the point mechanisms are electro-pneumatic is provided by duplicate sets of compressors, one only being in service at a time, with high and low pressure reservoirs, also in duplicate, each high-pressure reservoir being able to cover an hour's standby at maximum demand, after pressure has dropped to 80 per cent of normal. The air is compressed initially to about double the normal working pressure of 50 lb. per sq. in., and taken through reducing valves to the working, or low-pressure reservoir. Starting and stopping of the compressors



Transportable compressor set and duplicate reservoirs at outlying locations providing power for operating electro-pneumatic point mechanisms

is automatic and audible warnings in the signalboxes come into action immediately pressure on either the high- or low-pressure side falls to a prescribed figure. At the less important locations one compressor only is provided. Plastic tubing is used for the air mains and offers special advantages where there is a liability to external electrical influence.

Cables and Cable Routes

Signalling and telecommunication cables are run in channel troughing, generally at ground level and on the track side of the traction structures. Crossing of the track is effected either in underground conduit or by overhead structures, themselves entirely separate from the traction supports, and wiring. Multicore signalling cables are 1/.036 in. VR/PCP insulated, with PCP sheath. Telecommunication cables are of two main types: (1) 54-pair star-quad trunk-type paper-insulated air-spaced audio cables, with 40-lb. conductors within an insulated sheath, lapped with two PVC and one compounded cotton tapes, surrounded by four steel 40 mils armour tapes, within an outer protective covering of two PVC and two rubber tapes, one PVC tape, and a Hessian one overall with graphite finish; (2) 14-pair low-loss carrier-quad paper-insulated cables with 36-lb. conductors and sheath, armouring and outer covering similar to (1) above but with two instead of four steel tapes.

These telecommunications cables are specially designed to give magnetic screening against induction from the traction system and conform to C.C.I.T.T. recommendations that induced voltages under maximum traction fault and normal running conditions shall not exceed 430 and 60 V., respectively. The circuits are not long enough—that is, not over 15 miles long—to necessitate isolating transformers, and it is expected that induced voltages will be considerably below specified limits in practice. Sheaths and armour tapes are bonded and earthed at 1,000-yd. intervals for screening purposes and connected also to the protective earths at the lineside cabinets. Control and lineside telephone circuits for traffic, isolation and maintenance purposes, and supervisory control circuits, are accommodated in the audio cable. The carrier cable forms the first section of a new trunk through cable between Crewe and Manchester.

Telephones

There are telephones at all running signals and a number of others, for the use of the Chief Mechanical & Electrical Engineer, are connected to a temporary control point at East Didsbury, but later will operate to the traction control room at Crewe. Equipment of new design is being provided to enable the Manchester (London Road) Controller to dial and call selectively all stations, signalboxes, and so on, on the electrified route, with a plug-in system of maintenance telephones linking all trackside locations to the controlling signalbox. Later there will be a staff call system enabling a signalman to call maintenance staff to the telephone by sounding distinctive tones in loud speakers out on the track.

The whole of the signalling and remote control equipment was supplied by the Westinghouse Brake & Signal Co. Ltd. The remote control is known as their Westronic high-speed transistor system and requires one pair of wires only between each local relay interlocking and the signalbox. The train describer system was supplied by Standard Telephones & Cables Limited. The work was planned and specifications prepared under the direction of Mr. E. G. Brentnall, Signal Engineer, London Midland Region, and has been carried out to his requirements under the immediate supervision of Mr. C. G. Derbyshire, Modernisation Assistant. The scheme, as so far completed, provides colour-light signalling for 33 of the 40 route-miles between Crewe and Manchester, but its full advantage will not be obtained until the section from Slade Lane Junction to and including London Road terminus is brought into service.

B.T.C. Signal Development Centre at Leyton

(*Concluded from page* 170)

groove boarding, overlaid with three layers of felt, covers the beams. On the underside is an insulating blanket of glass fibre material. The ceiling is finished with plaster-board.

The floor is of concrete-slab construction, surfaced with thermo-plastic tiles in the laboratory and office. There are quarry tiles in the dark room, test room, and lavatories and granolithic paving in the compressor room and store.

Heating is by electricity, and there is a small water tank in the roof. All service piping and wiring are taken through the internal partitions. Ordinary tungsten lighting has been installed.

Contractors and Subcontractors

The general contractor for the building was R. F. King Limited, of Romford. Prefabricated timber components were supplied by Cubitt & Gotts Limited, of Ipswich. The electrical works were carried out by the Electrical Engineer, Eastern Region, and the telephones installed by the Signal Engineer of that region. Neuchâtel Asphalte (Contracting) Limited supplied and laid the thermo-plastic tiles. D. Anderson & Son Ltd. supplied and laid the roofing felt.

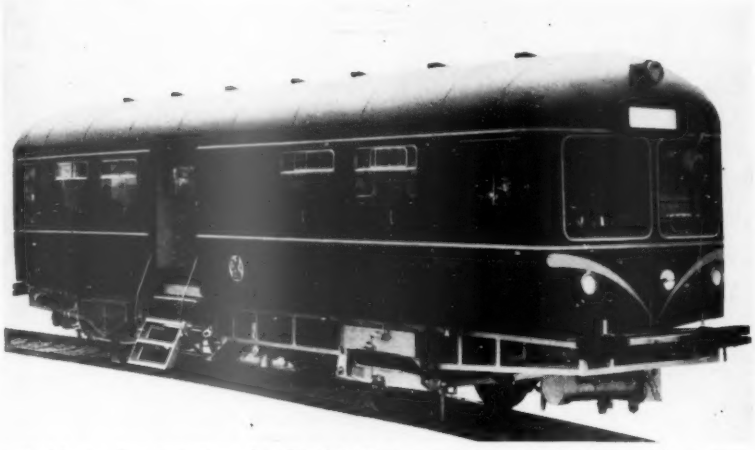
Other components were supplied by:—

Ironmongery	Standard Range & Foundry Co. Ltd.
Sanitary fittings	Stitsons Sanitary Fittings Limited
Vitreous enamel panels ...	Rustless Iron Co. Ltd.
Ventilation grills	Greenwoods & Air-Vac Co. Ltd.
Light fittings (laboratory and office)	Merchant Adventurers Limited

The centre is in the charge of Mr. J. H. Currey, Signal & Communication Developments Engineer, who is responsible to Mr. J. H. Fraser, Chief Signal Engineer, B.T.C.

Air Suspension on British Diesel Railbus

Wickham four-wheel vehicle for Scottish Region, to test Andre-Westinghouse pneumatic springing



Wickham diesel railbus for British Railways, Scottish Region, with nearest guard removed to show Andre-Westinghouse pneumatic axlebox suspension

BRITISH Railways recently took delivery of its first rail vehicle equipped with air suspension. This is a version of the 105-h.p. diesel passenger railbuses supplied previously by D. Wickham & Co. Ltd., but with a new and experimental suspension system sponsored by the British Transport Commission and designed and installed by D. Wickham & Co. Ltd. in collaboration with the Andre Rubber Co. Ltd.

The air spring design has been developed by the Andre Rubber Co. Ltd. in conjunction with the General Tyre & Rubber Co. Ltd., Akron, Ohio, U.S.A., and with air control equipment of Westinghouse Brake & Signal Co. Ltd. manufacture.

The vehicle is in fact the last of five 44-seat 11½-ton Wickham railbuses all placed by the Commission in May 1957 to a design which included laminated semi-elliptic springing with radius-bar axlebox control. The prototype British Railways railbus of this make was described fully in our September 12, 1958 issue. Preliminary trials of the pneumatically-sprung version already have taken place, and tests will continue during the vehicle's initial period of service with the Scottish Region of British Railways.

Other Features Unaltered

Principal features remaining unaltered from our previous description include the Meadows 6HDT500 8.14-litre six-cylinder horizontal power unit with Wickham-Freeborn disc-and-ring automatic coupling, the S.C.G. R11C epicyclic gearbox, the Wickham double-bevel reversing gear mounted in the single driving axle, the tubular-framed body construction with six-point Metalastik Cushyfoot mounting to the underframe, and the seating arrangement.

A slight variation is provision for the gear ratios to be selected and engaged automatically by S.C.G. VS control with CAV electro-pneumatic valves as an alternative to use by the driver of the miniature hand lever for servo change-speed control.

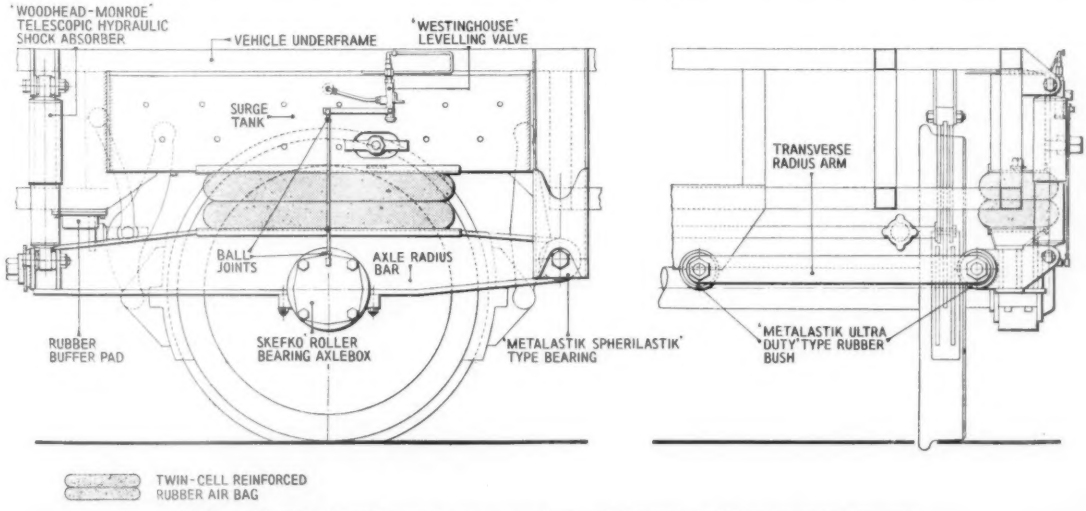
Bonded-Rubber Air Cells

The usual Wickham axle radius control bars are replaced by members which are of deeper section than hitherto and extended to double the original length. At the mid point of each radius bar, directly above that part to which the SKF self-aligning roller-bearing axlebox is attached, is a flexible reinforced rubber air bag consisting of two elongated and inter-connected cells bonded securely together and to upper and lower mild-steel location plates. Above the air bag is a welded steel rectangular air surge tank, which is an essential part of the "air spring," and built in to form part of the underframe.

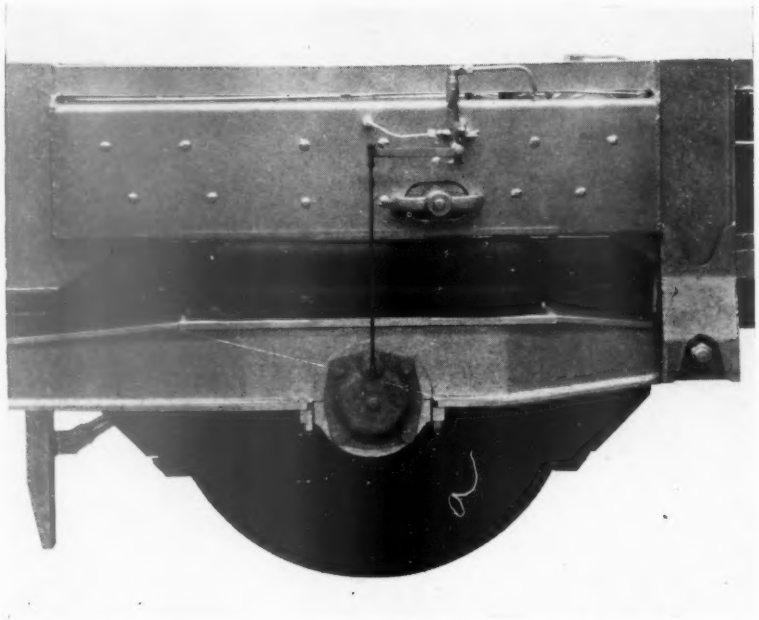
Vertical movement at the outer extremity of each radius bar member is controlled by a Woodhead-Monroe telescopic hydraulic shock absorber with 8-in. total movement, which ensures progressive damping of the suspension. A transverse radius arm, seen in the end elevation, relieves the air bags of any loading due to side thrust between wheel and rail.

Wear Eliminated

The main pivot of each axle radius bar is a Metalastik rubber-bushed bearing. Metalastik Ultra Duty bushes are used at the ends of each transverse radius arm, the inner ends being pivoted to the underframe cross members only 3 in. from the centre line of the vehicle. By the extensive use of rubber in this way



Side and end elevations of one complete pneumatic axlebox suspension unit



Air spring inflated and pressure adjusted for load automatically by level control valve on surge tank

frictional wear at the suspension pivots is eliminated without the need for lubrication or any other form of regular maintenance.

A rubber buffer pad limits dynamic upward axle movements and the distance which the chassis frame is lowered when the air springs are deflated. The extended axle radius bar acts as a beam when engaged with the buffer pad and when maintaining lateral stability under conditions of wheel flange action and so on; consequently it is of fairly massive proportions. Each air bag has internal bump rubbers as an additional precaution against trapping.

Static Deflection Constant

Mounted on and connected to the surge tanks are Westinghouse levelling valves with actuating levers and connecting rods to the axleboxes. These valves have been developed specially to control the air inlet and exhaust of the springs, so that the neutral position of the axle under static load conditions remains constant, and the floor-to-rail height does not vary with extremes of vehicle loading. Steel-framed expanded-metal guards protect the levelling-valves and connecting rods from accidental damage.

The frequency of any air springing system is related to the air volume and pressure. With the air spring dimensions fixed, the load-carrying capacity or "rate" of the spring depends entirely on the available air pressure. Approximate static pressures for the Andre-Westinghouse system as measured on the Wickham railbus are:—

For tare weight only	44 lb. per sq. in.
For tare plus load	59 lb. per sq. in.
For tare plus overload	74 lb. per sq. in.

The surge tanks are provided to ensure the necessary total air volume. Each flexible air bag has a volume of 660 cu. in. and this, together with the surge tank capacity, makes the total available volume 3,160 cu. in. for each spring.

The spring alone has a frequency of approximately 87 cycles per min., that is a periodicity of .69 sec., but the effect of the rubber bushes in the linkage is to raise slightly the actual frequency of the system.

Air at 90-110 lb. per sq. in. from the basic system of the railbus normally passes through a non-return valve and thence into a special reservoir for the suspension system. At the reservoir outlet is a filter and following this, air lines communicate with the supply cap nut in the top of each levelling valve. Control of delivery to or exhaust from the air springs is by a port in the side of the valve body, from which a pipe is led to the surge tank.

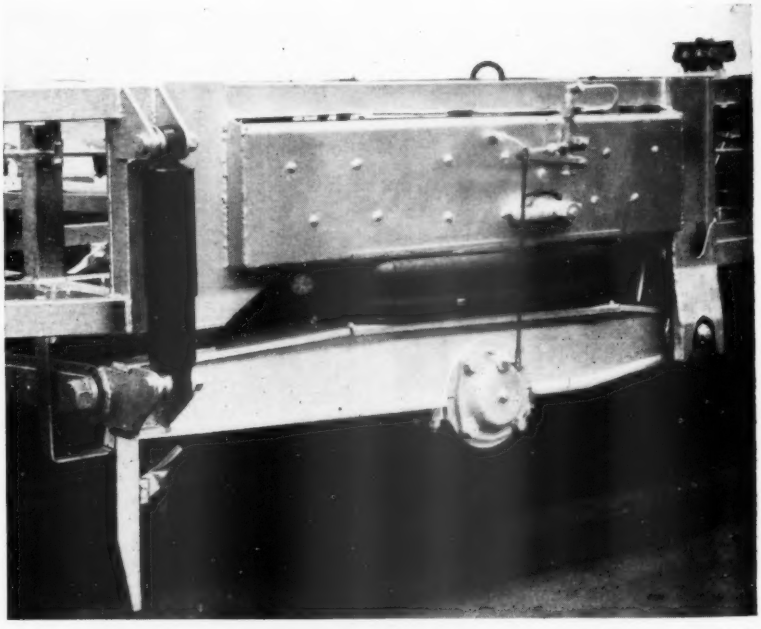
When the actuating lever is horizontal the passages through the valve are closed and air is sealed in the respective spring. Upward movement admits air and downward movement exhausts it. In this manner the control valve is able to compensate for variations in the vertical distance between the vehicle body and axle by increasing or decreasing the air pressure in the spring. In addition to varying spring stiffness to suit the load conditions, this has the effect of maintaining a constant floor height above rail level as long as pressure is held in the air reservoir. A two-stage calibrated valve controls the rate of air flow.

Stable Ride Conditions

The energy storage capacity of the air springs absorbs vertical loadings caused by track irregularities and rail joints, without allowing vibration to affect passenger comfort. Heavy dampers are essential to any rail vehicle suspension system lacking inherent frictional damping, and with the degree of control exercised by the shock absorbers on the Wickham Andre-Westinghouse-sprung railbus, remarkably stable ride conditions are achieved. Satisfactory results with notable absence of oscillation and sway have been obtained with tests of this vehicle on undulating track laid with short lengths of bull-head rail and with curves down to 7-ch. radius—conditions which are common for branch-line traffic.

As might be expected with any light-

(*Continued on page* 178)



Three-quarter view of air suspension showing transverse radius arm on left. Note tilted control-valve lever when air spring deflated

Repair of Flood and Avalanche Damage in Andes

Rapid reconstruction of bridges and earthworks after destruction by flows of mud and rocks

By J. P. Paton, B.Sc., M.I.C.E.,
Acting General Manager, Central Railway of Peru

THE problems faced by the world's highest standard-gauge railway, the Central of Peru, a Peruvian Corporation railway, in maintaining way and works in mountainous country and adverse weather conditions, are of exceptional difficulty. In 108 miles between Callao, the port of Lima, and the summit of the Andes the railway reaches a height of 15,688 ft. The maximum gradient is 1 in 23 uncompensated and there are long continuous stretches of 1 in 25.

While the western coastal belt of Peru is virtually rainless, from January to April there is a marked rainy season in the mountains and rain falls daily in the valley of the River Rimac up which the Central Railway runs. During these four months, therefore, it is usual to expect interruptions from landslides, more particularly because the western slopes of the Andes are at the beginning of the wet season almost without vegetation.

This condition also is the cause of a particularly vicious enemy to the Engineering Department, known locally as a *huayco*. The latter is the product of erosion of the hillsides from heavy or prolonged rainfall, which forms, instead of a normal flood of water down what is a dry valley bottom, a flow of mud in which are carried rocks of up to several tons in weight. In their most severe form *huaycos* are actually avalanches down the river bed. There is no protection possible from them and clearance is itself a major problem, as they cannot be dealt with by machines until they cease to flow and until they solidify to some extent.

During the last rainy season through traffic on the Central Railway between Lima and the interior was interrupted for two months.

The trouble began in the middle of February and is best described by a series of photographs. On February 14 a mud and rock avalanche came down a narrow valley into the River Rimac at Km. 103, just above the village of Matucana, temporarily blocking the river. Then the river swept all before it and cut two large breaches in the railway bank, one of which is shown below (left).

Repeated Breaches of Line

The water entered the village with great force and about 60 per cent of the *adobe*-built houses were demolished. The repairing of the embankment and its partial defence was completed by the morning of March 4, and on the afternoon of March 6 a further avalanche came down at the same place and caused the river to wash out 500 ft. of track, but did not breach the bank this time. After considerable stone defence work the line was repaired at this point at midday on March 13, after an interval of 28 days.

While this major repair was being carried out there were no less than 19 sizeable mudflows between Km. 63 and Km. 101, and 113 minor ones at scattered points over the line, all of which required men and some mechanical equipment for the clearing of the track and repairs. As the Central Highway, which also runs up the Rimac valley, was cut by the river and blocked by mud avalanches at many places, the servicing of the mechanical equipment and supplies of food for the men presented many problems.

The reopening of the line on Friday, March 13, was short-lived, as at 5 p.m. news was received that at San Juan (Km. 95) the 89-ft. span bridge and approach embankments had been washed away by an enormous mud avalanche which entered the river about 500 yd. up stream. The railway and road cross the valley at this point and both were completely destroyed. The existing bridge a through-plate girder span, replaced an old Warren deck bridge. The upper illustration on page 179 shows the new bridge being placed in 1956. The old one, which dates back to 1905, with its reduced clearance had stood up to floods all these years, though in the course of time the river bed has risen considerably. The new bridge of 1956 was considered to allow for the passage of any normal flood, though nothing within reasonable financial cost could have provided for the avalanche of mud and rocks which not only filled the bridge opening to the top of abutment level but also carried away the approach bank and a number of houses.

The bridge was swept off its abutments and carried some 500 ft. downstream. With the eventual freeing of the bridge from the spoil which was piled upon it the bridge returned to normal without any straightening, as shown on page 180 (top right).

The under cross-bracing was partially damaged and there are some other minor repairs to be done on the bridge. A very approximate estimate of the volume of mud and rock which came down at the time the bridge was carried away would be some figure over 30,000 tons. Rocks of 5 to 10 tons were found amongst the flow.

As no longer reserve bridge spans were available, and short spans with timber trestles are not feasible in a river of this nature, it was decided to remove the 37-ft. span shown on page 180 (bottom left), completely blocked by a mudflow a

Breach at Matucana after avalanche on February 14

After the second avalanche

Additional 10 *ft. length being bolted on to bridge at San Juan*

fortnight previously at Km. 89. The stream which flowed under this bridge cut the line some 160 ft. away and had been provided with a temporary opening of 14 ft. The adjacent illustration on the same page shows the span raised and ready to have a flat wagon placed under it to transport it up to San Juan. To be able to make an abutment clear of the river, which was flowing very strongly, it was necessary to add an additional 10 ft. to this span and this additional length was made in the permanent way workshops within four days, including the drawing office work. The illustration opposite shows the additional length being bolted on at site.

The north abutment was founded on a large surface rock whose size assured a reasonable foundation. The south abutment had to be founded superficially, the ground being the typical large river stone conglomerate found in the valley in which any form of piling sheet or otherwise is impracticable. The 47-ft. span bridge was launched by an engine pushing the span specially fixed for sliding on the rails, and provided with kentledge in the form of 16 rails placed at the engine end. At a certain point the breakdown crane took a part of the weight as launching continued to the other abutment.

Completion of New Bridge

The bridge at San Juan was completed on March 30 and the line opened to traffic on the following day, 18 days after the disaster, and 46 days after the first interruption on February 14. The approach banks were made up by bulldozers working with a shovel and tip lorries. The completed bridge is shown in the illustration on this page.

47-*ft. span bridge being pushed into position by locomotive*

Bridge at San Juan completed 18 *days after washaway*

Air Suspension on British Diesel Railbus

(*Concluded from page* 176)

weight railbus, noise transmitted to the passenger compartment from the wheels crossing frequent rail joints is more noticeable than with bogie rolling stock. This applies equally at slow and intermediate speeds as at the maximum of 53 m.p.h. No doubt a simple remedy could be sought by acoustic treatment below the aluminium and hardboard floor ; several methods are available.

The choice by the B.T.C. of a four-wheel vehicle for testing air suspension is wise, for even at the lower speeds, any lack of comfort or stability is more easily detected than with heavier passenger stock.

In addition, for both passenger comfort and safety reasons, the aim should be to develop riding qualities which are equally satisfactory whether the vehicle is empty or fully laden. In that direction, the Andre-Westinghouse installation successfully shows the immense possibilities which lie ahead in achieving smooth running and freedom from vibration.

RELATIONSHIPS IN INDUSTRY—The Scottish conference on " Relationships in Industry—Some Changing Concepts of Management," organised jointly by the British Institute of Management and the Ministry of Labour, will be held at Gleneagles Hotel on October 23-24. The object is to bring together Scottish industrialists to examine and discuss management responsibilities in relation to human problems in industry. Speakers, all prominent men from industry and education, will include Mr. F. Donachy of the British Transport Commission, and Mr. Edward Denny, Chairman of William Denny & Bros. Ltd. and Chairman of the B.I.M. Council for Scotland.

Repair of Flood and Avalanche Damage in Andes

New bridge at San Juan being placed in 1956, *replacing old Warren type deck bridge*

Site of San Juan bridge (shown by dotted line) after being washed away on March 13, 1959, *showing bridge opening filled by mud avalanche to top of abutment*

Repair of Flood and Avalanche Damage in Andes

Twisted state of San Juan bridge after being carried 500 ft. downstream

Bridge returned to normal shape without straightening after removal of debris

Clearing 37-ft. span which had been completely blocked by mudflow

Span raised from mud, ready for placing wagon for transport to San Juan

RAILWAY NEWS SECTION

PERSONAL

Mr. T. E. H. Fussell has been appointed Comptroller of Stores, New South Wales Government Railways. He succeeds Mr. B. T. Ruting, who has retired.

Mr. R. A. Smeddle, M.I.Mech.E., M.I.Loco.E., Chief Mechanical & Electrical Engineer, Western Region, British Railways, who as recorded in our March 6 issue, has been elected President of the Institution of Locomotive Engineers, was educated at Aysgarth and Harrow. Mr. Smeddle served in the R.F.A. in France during the 1914-18 war and also in the Army of Occupation; towards the end of 1919 he joined the North Eastern Railway as a pupil. Subsequently he gained experience in the Running Department of the L.N.E.R. at Leeds, and the Traffic Department at York. In 1925 he was appointed Assistant Works Manager, Cowlairs, and three years later became Assistant Carriage & Wagon Works Manager, York. In 1929 Mr. Smeddle was transferred to London as Outdoor Carriage & Wagon Assistant, and in 1931 returned to Cowlairs as Works Manager. In 1936 he was appointed Locomotive Works Manager, L.N.E.R., North Road Works, Darlington, retaining this position until 1941, when he was appointed Mechanical Engineer, L.N.E.R., Darlington, and took charge of the works at Shildon, Faverdale and Walker Gate, in addition to North Road. In 1945 the York Carriage & Wagon Works were added to his responsibilities. Mr. Smeddle was appointed Deputy Mechanical & Electrical Engineer, Southern Region, British Railways, in October, 1949, and became Mechanical & Electrical Engineer, Western Region, in 1951. He assumed his present title of Chief Mechanical & Electrical Engineer on January 1, 1955. In July, 1957, he assumed, in addition, the responsibilities of the Carriage & Wagon Engineer, and also the overall responsibility for all locomotives, rolling stock and outdoor machinery. In February, 1958, the Road Motor Engineer's Department came under Mr. Smeddle.

Mr. R. A. Smeddle
President of the Institution of Locomotive Engineers

Mr. G. W. Fruin
Comptroller of Stores, W.A.G.R. 1948-59

Mr. W. B. S. Miller, Assistant Engineer (Special Duties), Chief Civil Engineer's Office, York, North Eastern Region, British Railways, has been appointed Principal Assistant to the General Manager.

Mr. S. G. Ward, Regional Establishment & Staff Officer, Western Region, British Railways, has been admitted to the Order of St. John of Jerusalem in the grade of Serving Brother. Mr. Ward is Chairman of the Western Region Ambulance Centre.

Mr. Denys L. T. Oppé, Managing Director of Robert Benson, Lonsdale & Co. Ltd., and Chairman or Director of several other companies, has been appointed a Member of the Southern Area Board, British Transport Commission. Mr. Oppé will fill the vacancy caused by the appointment of Mr. A. B. B. Valentine as Chairman, London Transport Executive.

Mr. G. G. Thompson, a Director of Thomas Tilling Limited, has been appointed Deputy Managing Director.

Mr. Sydney Cott, District Passenger Superintendent, Newcastle, North Eastern Region, British Railways, has been appointed District Goods Superintendent, Newcastle.

Mr. G. W. Fruin, Comptroller of Stores, Western Australian Government Railways, who, as recorded in our June 5 issue, is retiring, was born in 1894. Mr. Fruin joined the railways in 1911, as a junior draughtsman in the Civil Engineering Branch. He subsequently became a draughtsman, Assistant Engineer and District Engineer, a position he held until his appointment, in 1948, as Comptroller of Stores. He was closely associated with the Timber Mill Section of the Stores Branch, and supervised the change-over of bush operations from a point 28 miles north of the mill to a new concession, 45 miles south of the mill. He was responsible for the design and construction of a gravity water supply, instead of a pumping installation; the inauguration and functioning of district stores and the introduction of mechanised handling and palleting of stores. Mr. Fruin joined the Railways Institute in 1911, and rendered much valuable assistance in its development. On his appointment as Comptroller of Stores, he also became the Commissioner's representative on the Institute Council, and, in 1949, he was elected General President of the Institute. Early in his railway career he took a keen interest in the Ambulance movement. Joining at Fremantle, in 1912, he was Captain of the movement for several years. He led the Western Australian team in the first inter-state competition in 1921.

Mr. O. G. Götzsche
Chief Signal Engineer, Danish State Railways, 1944-59

Mr. W. W. Hansen
Appointed Chief Signal Engineer, Danish State Railways

The late Mr. F. G. Crabb
Commercial Officer, Eastern Region, 1957-59

Mr. O. G. Götzsche, Chief Signal Engineer, Danish State Railways, who, as recently recorded, has retired, joined the Danish State Railways as a signal engineer in the General Directorate. In 1919 he was transferred to No. 2 District, Aarhus, as Assistant Signal Engineer. In 1922 he was appointed Signal Engineer, Struer District, and, in 1932, Signal Engineer, Copenhagen District. Mr. Götzsche was promoted to be Chief Signal Engineer in 1944, the position he held until his recent retirement.

Mr. H. Thompson, Stationmaster, Middlesbrough, North Eastern Region, British Railways, has been appointed Stationmaster, York.

Mr. C. A. Harris has been appointed Acting Director of Public Relations, Canadian National Railways, from October 1. Mr. W. R. Wright, Head of the Department, relinquishes his position on that date, to become President of McCann-Erickson (Canada) Limited.

TRANSPORT USERS' CONSULTATIVE COMMITTEE WALES & MONMOUTHSHIRE

The term of office of the Transport Users' Consultative Committee for Wales & Monmouthshire has expired. The Minister of Transport & Civil Aviation has appointed a new committee which will serve until July 31, 1962. Mr. R. G. M. Street will be Chairman, and Mr. E. G. Gomm, Secretary. The following will be members:—

Representing Agriculture
Mr. R. P. Turner, Mr. J. T. Harries.

Representing Commerce & Industry
Captain H. Leighton Davies, Mr. R. P. Roberts, Mr. W. Hazell, Mr. F. R. Graesser-Thomas, Mr. D. Pexton.

Representing Shipping
Mr. O. L. Harries, Mr. J. C. Radcliffe.

Representing Labour
Mr. R. Parry, Mr. W. Friend, *Mr. T. Jones.

Representing Local Authorities
Mr. W. Hugheston-Roberts, Mr. G. R. Davies, *Mr. D. Tudor, *Mr. C. A. Horwood.

Representing B.T.C.
Mr. W. R. Stevens, Mr. W. Jeffers.

Additional member
Professor A. Beacham.

One additional member has yet to be appointed.

* Indicates new member.

Mr. W. Wessel Hansen, Chief of the Design Office & Deputy Chief Signal Engineer, Danish State Railways, who, as recently recorded, has been appointed Chief Signal Engineer, was born in 1905. Mr. Hansen joined the Danish State Railways, in 1930, as a signal engineer in the Copenhagen District. In 1937 he was moved to the General Directorate, with special duties in connection with the standardisation of signal components and interlocking apparatus. He was appointed Assistant Signal Engineer in 1944, and became Chief of the Design Office & Deputy Chief Signal Engineer of the Danish State Railways in 1946.

Mr. F. G. Crabb, Commercial Officer, Eastern Region, British Railways, whose death, on August 29, was briefly recorded last week, started his railway career with the Great Northern Railway, in 1913, as a junior clerk in the Goods Depot at Kings Cross. During the 1914-18 war, he served with the Honourable Artillery Company. After his return to railway service, Mr. Crabb gained experience at various stations and commercial offices until, in 1945, he was appointed Chief Claims Clerk in the Goods Manager's Office, where he was responsible for the introduction of new claims prevention methods. In 1946, he became Deputy Chief Assistant, Goods Rates & Charges. In 1953 he was made Assistant to Commercial Superintendent, Freight Rates & Charges, Eastern Region, British Railways, when he was a member of the Freight Charges Advisory Panel, which was formed to consider a new merchandise charges scheme. Mr. Crabb was appointed Acting Assistant Commercial Manager, Eastern Region, in 1956, and the following year became Commercial Officer.

The funeral service was held at the Church of St. Martin of Tours, Chelsfield, on September 3, followed by a short service at Beckenham Crematorium. In addition to family mourners, the following were among those who attended:

British Transport Commission
Messrs. B. X. Jessop (also representing Mr. T. H. Hollingworth), F. Grundy, A. A. Harrison (also representing Mr. E. A. W. Dickson).

Eastern Region
Messrs. S. G. Hearn (also representing Sir Reginald Wilson, Members of the Eastern Area Board, Mr. H. C. Johnson, and Mr. A. J. White), A. W. Tait, H. Hoyle J. W. Dedman, G. Coaker (also representing Mr. W. G. Thorpe, and Mr. T. C. B. Miller); H. L. Crank, H. W. Few, H. W. Graham, L. H. Joslin, G. F. Haines (representing Mr. G. F. Huskisson, and Mr. F. M. Wright); R. A. Laird (representing Mr. C. S. MacLeod, Mr. A. L. Crewe, and Mr. A. T. S. Rayner); F. E. Longhorn (also representing Mr. G. F. Fiennes), A. Manchester (representing Public Relations & Publicity Officer's Department), B. T. Randall, S. C. Webb (also representing Mr. E. J. Stephens, and the Scunthorpe Traffic Committee), E. R. Williams (also representing Mr. R. B. Temple), L. Craven (also representing Mr. W. Brown, and Mr. C. N. Montague), F. W. Chilton, L. S. Williams, A. R. Coakes (all representing staff of the Freight Rates & Charges Section), J. H. Pentney, J. Wilkinson (both representing staff of the Fares & Charges Section), L. G. Bettiss (representing staff of the Commercial Section), B. M. Thompson.

London Midland Region
Mr. A. J. Johnson (also representing Mr. E. W. Arkle).

North Eastern Region
Mr. W. H. Vine (also representing Mr. J. Blackstock).

Western Region
Mr. R. J. Hill (also representing Mr. E. Flaxman, and Mr. F. E. Phasey). Mr. H. D. Poole (retired).

Southern Region
Mr. F. P. B. Taylor (also representing Mr. W. H. F. Mepsted).

Railway Clearing House
Mr. W. S. Cutler, Mr. W. N. Price.

London Commercial Service
Mr. H. A. Yates.

Transport Salaried Staff Association
Messrs. E. Davies, G. S. Lindgren, G. B. Thorneycroft, A. Sams.

East Anglia Area, T.U.C.C.
Mr. M. O. Gill, Mr. F. E. Tyler.

Others present
Messrs. C. N. Lidguard (Davies & Robson Limited), G. Melton (Wiggins Teape & Co. Ltd.), D. S. Harlock (Cement Marketing Co. Ltd.), H. Lloyd Davies (J. L. Davies & Co. Ltd.), G. Adlem, A. G. Taylor (both of Esso Petroleum Co. Ltd.), H. Gardiner, S. Ryder (both of F. W. Woolworth & Co. Ltd.), J. W. Bannard (Unilever Limited).

Mr. Norman Readman, Managing Director, Consolidated Pneumatic Tool Co. Ltd., has been appointed Chairman of Jacobs Manufacturing Co. Ltd., Frank Guylee & Son Ltd., and Reichdrill Manufacturing Co. Ltd.

THE LATE MR. HERBERT PARRY

The funeral of the late Mr. Herbert Parry, Senior Assistant Secretary, Transport Salaried Staffs' Association, who died on September 3, and whose obituary appeared in last week's issue, took place at Golders Green Crematorium on September 9. The service was conducted by the Reverend A. Donald Brown, and an address was given by Mr. W. J. P. Webber, General Secretary, T.S.S.A. In addition to family mourners, the following were among those present:—

Transport Salaried Staffs' Association

Mr. W. J. P. Webber, Mrs. R. J. Gunter (representing Mr. Gunter), Messrs. G. S. Lindgren, A. Sams, F. G. Childs, G. W. Groves, W. H. Johnson, N. Rose, H. W. Scrivener, L. C. Ward, S. Douglas, J. W. Davies, A. P. Coldrick, D. W. Humphries, F. Perry and other members of Head Office staff.

Messrs. C. B. Thorneycroft, F. W. Dalley, F. L. E. Watts, F. H. Sampson, E. G. Macauley, H. Stannard, J. C. Walker (Russell Jones & Walker, Solicitors), G. R. Rogers (representing T.S.S.A. Parliamentary Group), representatives of Divisional Councils and branches.

Former Presidents

Mr. H. G. Romeril, Mr. J. Haworth.

National Union of Railwaymen

Messrs. W. Ballantine, J. B. Drongeson, G. W. Chambers, A. Edmondson (representing Head Office staff).

Associated Society of Locomotive Engineers & Firemen

Mr. W. J. Evans.

Transport & General Workers' Union

Mr. C. Akroyd.

Railway Workshop Supervisory Staffs' Joint Negotiating Committee

Mr. C. Jenkins (representing Mr. H. G. Knight).

International Transport Workers' Federation

Mr. P. de Vries.

British Transport Commission

Messrs. K. W. C. Grand, C. S. McLeod (also represented Mr. A. R. Dunbar), D. Robertson (also represented Sir John Benstead).

Railways Staff Conference

Mr. J. P. Mead.

London Midland Region

Messrs. J. G. Norton (also represented Mr. David Blee and Mr. H. Aidley), K. L. Mallory, A. Nicholson.

Eastern Region

Messrs. W. T. Buxton, W. Phillips.

Western Region

Messrs. S. G. Ward, W. G. Canning, A. C. Parker, B. Court.

Southern Region

Messrs. H. C. Lang, G. H. Luck.

Scottish Region

Mr. J. D. Barber (also represented Mr. D. F. Gowen).

London Transport Executive

Messrs. A. Bull, F. G. Maxwell, A. J. Webb, L. A. N. Ginger (also represented Mr. T. S. Pick), W. H. Mallett (also represented Mr. R. J. Hitchcock), D. H. Mills (also represented Mr. F. H. Spratling), H. W. Cottam, H. G. Woodward.

British Transport Hotels

Messrs. D. A. Campbell (also represented Mr. H. G. B. Kelly), G. E. Turton.

British Road Services

Mr. I. K. Macalaster.

Thos. Cook & Son Ltd.

Mr. P. S. Welham.

Others Present

Among others present were representatives of the St. Albans Bowling Club and of the St. Albans Co-operative Society.

We regret to record the death in Buenos Aires, at the age of 74, of Mr. Percy Goddard, Traffic Manager, Central Argentine Railway, 1943-47.

We regret to record the death in Córdoba, Argentina, of Mr. Norman Stocks, General Manager, Paraguay Central Railway, 1944-46.

Lord Knollys, Chairman of Vickers Limited, has been elected Chairman of English Steel Corporation Limited in succession to the late Sir Frederick Pickworth.

Mr. S. R. Hall, Assistant Works Manager, Carriage & Wagon Engineer's Department, Cowlairs Works, Scottish Region, British Railways, has been appointed Technical Development Officer, Eastleigh Carriage & Wagon Engineer's Office, Southern Region. He succeeds Mr. H. Wilcock.

Mr. L. R. Smith, General Superintendent, British Columbia District, Canadian Pacific Railway, has been appointed, Assistant to the President, C.P.R. He succeeds Mr. D. M. George who has retired. Mr. E. P. Jolicoer, Secretary to the President has been appointed to a newly-created position of Special Assistant to the President.

Mr. J. L. Blackwood, Managing Director of the South African company of Leyland Motors Limited, has joined the board of Leyland Motors Limited, England, the parent company of the group.

Mr. Robert R. Keller, Mr. Peter Tonge and Mr. Robert H. Sitch, Senior Executives of Super Oil Seals & Gaskets Limited, have been appointed to the board as Executive Directors.

Mr. J. C. Gardiner, Traffic Research Officer, Canadian National Railways, has been appointed Assistant Freight Traffic Manager. Mr. Gardiner joined the C.N.R., as a Junior Assistant Traffic Economist, Research & Development Department, in 1946. In 1949 he became Assistant Traffic Economist and served in Montreal Winnipeg and Toronto. He returned to Montreal, in 1955, as Transport Economist, and became Traffic Research Officer the following year. Mr. Gardiner is a Bachelor of Arts and Master of Commerce.

Mr. W. Mullins, Assistant Superintendent, Road Services Branch, Railways Department, New Zealand Government Railways, has retired after 40 years' service. He is succeeded by Mr. J. B. Dykes, District Manager, Wellington Road Services Branch. Mr. Mullins entered the railway service in 1919, and received his early training in the Traffic Branch. Except for two years, 1927-28, in the Aukland district, most of his service was spent in the Wellington area. In 1930, Mr. Mullins was transferred to the then newly-formed Road Services Branch. He was appointed Assistant Superintendent in 1956.

Mr. Percy M. Holman has been elected Chairman of Holman Bros. Ltd., in succession to the late Mr. A. T. Holman.

Mr. James L. Ritchie has been appointed an Associate Director of Holman Bros. Ltd., and Sales Director of the Holman group. Mr. J. F. Holman, who recently became Joint Managing Director of Holman Bros. Ltd., has relinquished responsibility for group sales direction. Mr. Ritchie is a former director of Aveling-Barford Ltd, and has more recently been Assistant to the Managing Director of the Consolidated Pneumatic Tool Co. Ltd., an appointment which he has resigned.

We regret that the name of Mr. G. L. Darbyshire was omitted from last week's account of the memorial service, on September 7, to the late Sir William Wood. Mr. Darbyshire was represented by Mr. A. J. Pearson, who also represented Mr. David Blee.

Mr. P. Rees, Assistant District Engineer, London District, Paddington, Western Region, British Railways, has been appointed Organisation & Methods Assistant, Chief Civil Engineer's Office, Paddington.

Mr. A. J. Sweetman, District Express Agent, London, Canadian National Railways, has been appointed General Express Agent. He succeeds Mr. J. K. Buchan, who is retiring. Mr. S. Goodman, Chief Clerk, European General Manager's Department, becomes District Express Agent, London.

Mr. A. Mosley has been appointed Public Relations Officer, Mobil Oil Co. Ltd. He succeeds Mr. Peter Matthews.

Mr. C. H. Jackson has been appointed Chairman of the Telephone Manufacturing Co. Ltd., and is joint Managing Director with Mr. P. B. Healey. These appointments follow the death of Mr. F. T. Jackson.

Sir Alexander Fleck, Chairman of Imperial Chemical Industries Limited, will resign next February. He will be succeeded by Mr. S. P. Chambers, a Deputy Chairman. Sir Alexander Fleck will also retire as a Director of the company, with which he has been associated for more than 44 years.

Sir Halford Reddish has been elected a Director of Alfred Herbert Limited. He will act in a consultative capacity. He is Chairman & Managing Director of the Rugby Portland Cement Co. Ltd., a Director of the Hawker Siddeley Group and a member of the London Board of the Scottish Union & National Insurance Co. Ltd.

Mr. G. B. Perry has been appointed Managing Director, Axia Fans Limited, a member of the Hall-Thermotank group. He has also been appointed a Director of Vent-Axia Limited, and will retain his seat on the board of Thermotank Limited. Mr. R. C. Adie has been appointed General Manager the International Products Division of Thermotanks Limited, and Mr. H. J. Watson will be General Manager of the Engineering Division.

Mr. L. P. Lee, Chairman & Managing Director of Coventry Climax Engines Limited, and of Coventry Diesel Engines Limited, has been appointed Chairman of the British Internal Combustion Engine Manufacturers' Association for the coming year. He succeeds Mr. A. V. Wilkin. Mr. H. Desmond Carter, Chairman & Managing Director, Crossley Premier Engines Limited, becomes Vice-Chairman of the Association.

Associated Electrical Industries Limited, announces that the following district office appointments were made when the A.E.I. offices took over from the offices of British Thomson-Houston Co. Ltd., Metropolitan-Vickers Electrical Co. Ltd., and Ferguson Pailin Limited, last month: Home District Office Executive; General Manager, Mr. W. A. Ankerson; District Office Executive Manchester, Mr. R. S. D. Bagnall; District Office Executive, Rugby, Mr. K. G. Leach. The following Regional Managers have been appointed: Scottish, Mr. L. Witham; North Western, Mr. A. C. Ellis; Northern, Mr. A. J. Crawford; North Midlands, Mr. W. J. Wilson; Midlands, Mr. K. J. Clarke; South Western, Mr. J. S. Hall; Southern, Mr. E. Mead.

XUM

NEW EQUIPMENT AND PROCESSES

New Range of Spraying Equipment

UNDER an agreement with the Gray Company Inc. of Minneapolis, U.S.A., sole distribution rights in the United Kingdom for the complete range of Graco industrial equipment has been obtained by Alfred Bullows & Sons Ltd.

The Graco range is already well known in this country, particularly in the automobile industry. It includes the Hydra-Spray airless spray-painting equipment, heavy material spray and extrusion equipment, and fluid transfer equipment of all types.

These pumps are all air-operated. There are models suitable for handling all types of fluids and semi-fluids, from inks and paints to heavy mastics and putties.

The illustration shows a specially-fitted demonstration vehicle now touring the U.K. Further details and literature can be obtained from Alfred Bullows & Sons Ltd., Long Street, Walsall, Staffs.

High-Speed Loading

THE " Hydracon " hydraulic conveyor is a new piece of loading and unloading equipment claimed to offer many advantages and to suit a wide variety of loads. It can be carried by the delivery vehicle, and is very competitive in price.

The standard unit will handle castings, packages, sacks, and other small units in single or multiple loads up to 120 lb. Heavier loads can be accommodated by the use of ball-bearing idlers. Troughing idlers can be incorporated to facilitate bulk loads.

A welded frame of high-grade aluminium-alloy extruded sections provides a light, strong structure, resistant to corrosion and not requiring painting. It is mounted on two wheels at the lower and and can easily be handled and operated by two men.

The rough-faced rubber belt which runs at 200 ft. per min. is 10 in. wide, but conveyors can be supplied to suit 12 in., 14 in., 18 in., and 24 in. belts. Belt speeds can be reduced. The distance between pulley centres is 15, 20 or 25 ft. When roughfaced belting is used, incline angles in excess of 30 deg. can be used giving a take-off height of 8 ft. 6 in.

The hydraulic pump is driven by power take-off on the lorry engine or by a small petrol engine. The conveyor drum is driven by hydraulic motor through V belts and a reduction gearbox. Connection between power unit and hydraulic motor is by rubber hose fitted with quickly detachable, self-sealing couplings which ensure that no oil is lost when coupling or uncoupling.

Further information can be obtained from Aero Controls Limited, Industrial Estate, Weedon Road, Northampton.

Coal Tar Epoxy Coating

EPI-TAR is a new coal tar-epoxy coating claimed to possess properties of particular value to civil engineering contractors and others requiring a material with first-class protective properties applicable under any weather conditions.

The following advantages are claimed: a coating thickness up to 10 thou., in a single brushed coat; good protection against corrosion in a wide range of conditions; good resistance to acids and alkalies, petrol, diesel fuels, petroleum solvents generally, and oils, fats, and greases. Excellent water-resistance, including salt water and hot water; low surface preparation requirements; good curing properties under almost any weather conditions, even if immersed in water almost immediately after application; a very long pot life (about five days) after mixing; a high rate of coverage (from 250 to 300 sq. ft. per gal. having regard to thickness of coating); harmlessness in use.

Flash point of the solvents is 85 deg. F. Colours are black and mid-brown. Net industrial user price for both is 68s. 6d. per gal., including hardener. Delivery is prompt.

Further details can be obtained from Corrosion Limited, Southampton.

B.I.G. Cutting Equipment

WE regret that, as a result of block transposition, there was inaccuracy in the presentation of the account in this section last week of the American-designed oxy/fuel gas cutting equipment now being manufactured by British Industrial Gases Limited. The top illustrations showed (left) the multi-stage regulator and (right) the cutting torch. The lower illustrations showed (left) the three-hose injector-type torch and (right) the 48DC oxygen-saving regulator.

Range of Tools

A RANGE of Stanley American-made power and hand tools is now available in this country which includes routers, builders' saws, sabre saws, belt sanders, and rubber cutters.

In the hand tool range are chisels, cornering tools, bench stops, clamps, " Yankee " offset ratchet screwdrivers, screw mates, dowelling jigs, line bevels, roofing squares, carpenters' squares, combination squares, bevels, angle dividers, marking gauges, Chalk-O-Matic chalk lines, butt gauges, and power bore bits.

Although these tools are manufactured in the U.S.A., servicing facilities are available in this country. A service department has been established at Sheffield.

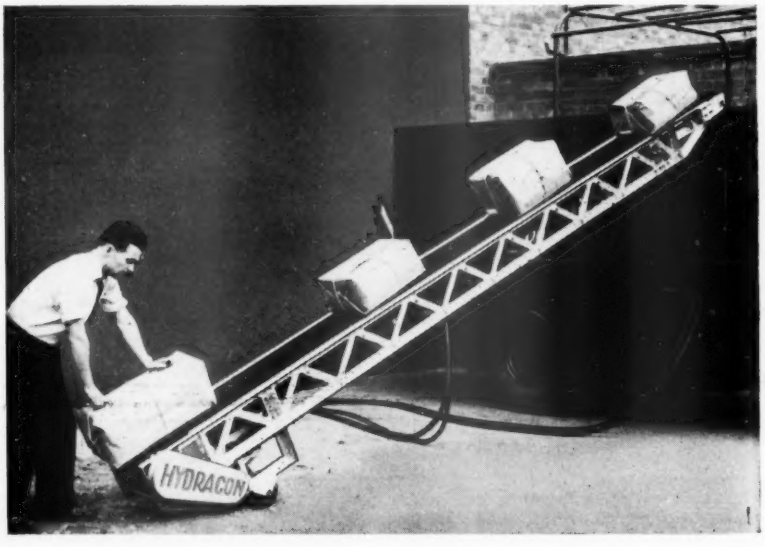
Further information can be obtained from the Manager, Home Sales, Stanley Works (G.B.), Ltd., Rutland Road, Sheffield.

Co-ordinate Plotting Table

A PLOTTING table has been developed in which the pen position along the " X " and " Y " axis is proportional to the d.c. signals applied to these axes. It incorporates a time base which can be switched into the " X " axis so that the table can be used to plot any function against time and thus becomes a low-speed recording oscilloscope.

Applications include servo-performance analysis, the plotting of frequency response, the drawing of stress-strain diagrams, and any other use where the two functions to be graphed can be represented by the voltages. In test houses and production lines it can be used to draw calibration curves.

The table is a self-contained instrument contained in a lightweight metal casting. A hinged Perspex window provides an unrestricted view of the graphing area. This, 15 in. by 10 in., will take standard graph paper. The capillary pen is traversed in the " X " and " Y " directions by a system of



wires to ensure minimum backlash. Controls are mounted on a sloping front panel.

The table operates from a 200-250 V. a.c. 50-cycle supply and consumes approximately 250 W. Dimensions are 24 in. wide by 20 in. deep by 8 in. high. Weight is approximately 75 lb.

Further details can be obtained from the manufacturer, Bryans Aeroquipment Limited, 1, Willow Lane, Mitcham, Surrey.

Tyre Treads

TO provide a tyre to match the improved performance of modern light trucks, the Highway tread pattern has been introduced on Dunlop's truck tyres. The new tread, which is slightly wider and flatter than that of the Highway, incorporates embedded knife cuts to give stability during fast-cornering. The casing of the tyre is protected from glancing blows by sturdy buttresses.

Further details can be obtained from the Dunlop Rubber Co., Ltd., 10-12, King Street, St. James's, London S.W.1.

Portable Sludge Pump

A PORTABLE ejector-type self-priming sludge pump has been designed for working at low heads. Capable of handling very dirty, contaminated, and gritty water containing a high percentage of solids, it is operated by compressed air at 80 lb. per sq. in. It gives a maximum delivery of 43 g.p.m with a 10-ft. head of water and can operate with heads up to 50 ft. to provide 35 g.p.m. It will remove drill sludge from headings, drain deep trenches on construction projects, remove sludgy deposits in coffer dams and caissons and perform any operation involving the removal of water containing suspended abrasive solids.

Of lightweight construction, the pump can be easily carried and handled by one man and needs only a single-tool compressor. Its automatic operation is almost foolproof and maintenance requirements are slight. Ball valves are self-cleaning and self-sealing and inner mechanism is acid-resistant.

The pump comprises a main tank and top-and-bottom cover assemblies. Operation is controlled by a float within the tank which actuates an air valve in the top cover. When the pump is empty the air valve is open allowing compressed air to pass from a ¾-in. inlet to atmosphere causing a vacuum within the tank. A non-return ball valve in the bottom cover allows water from the source to enter through a strainer. Water and float rise until the float closes the air valve. As the air cannot escape to atmosphere it pressurises the tank and forces the liquid down, closing the non-return suction valve in the bottom cover. The water then leaves the pump through the non-return delivery valve in the 2-in. delivery pipe. A time-lag mechanism allows the float to drop to a pre-determined level before the air valve opens to re-start the pumping cycle.

The pump is 24 in. high by 12½ in. in dia., and weighs 78 lb. It costs £68, and is in current production.

Further details can be obtained from Holman Bros. Ltd., Camborne, Cornwall.

Hardness Testing Machine

A NEW air-operated Olsen "Air-O-Brinell" hardness testing machine, which was recently introduced in the United States is now available in this country. This new machine combines the compactness and accuracy of hand-operated models with the operating ease of motor-driven types, and can be used in the laboratory or on the production line.

Mechanical linkages, deadweights, and hydraulics are eliminated. The principal of the new machine is that accurately-regulated air pressure is applied by a heavy-duty, long-stroke diaphragm to the movable ram carrying a hardened steel ball which, in turn, applies the pre-selected Brinell load to the specimen. On closing the load valve, retraction of the ram is automatic.

Under normal operating conditions only 1·2 cu. ft. of delivered air per min. at a minimum pressure of 65 lb. per sq. in. is required for operation. As the amount of air accumulated in the head is accurately controlled, fluctuations in air supply above 65 lb. per sq. in. have no effect on operation or accuracy.

Load application is positively assured by an air gauge which indicates the load to be applied before the test is made. Simple adjustment controls air pressure until desired load is indicated, after which any number of tests can be made in rapid sequence.

Calibration is accurate for the standard

range of Brinell loads of 500, 1,000, 1,500, 2,000 and 3,000 Kg. and can be checked at any time.

Further information can be obtained on application to the manufacturer Edward G. Herbert Limited, Atlas Works,Levenshulme, Manchester, 19.

Anti-corrosive Primer

LEDOMIDE P. is a new calcium plumbate primer for iron and steelwork.

The new primer is claimed to flow better than red lead primer and produce a smoother film, to be easier to apply, lighter in weight and therefore easier to handle. It dries ready for the next coat within 18 to 24 hr. and its creamy buff colour makes it more easily obliterated by subsequent coats of paint. It can be applied directly to clean galvanised iron surfaces and has good adhesion to wooden surfaces.

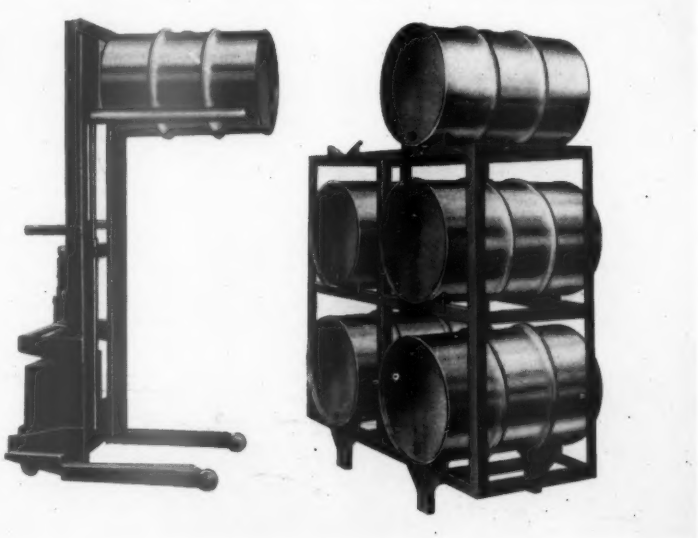
Further details can be obtained from Jensen & Nicholson Limited, Stratford, London, E.15.

Hydraulic Barrel Stacker

THE "Vertolifter" range of hydraulic elevator trucks, has been augmented by a new model equipped with tubular forks and designed to lift drums weighing up to 700 lb. directly off the ground to a height of 56 in. or 70 in. It can, therefore, load or unload as well as stack.

Masts are of heavy steel-channel construction and all moving parts have ball or roller bearings. All models are issued with a test certificate.

A two-speed hand hydraulic pump provides power, or the pump can be driven by three-phase or single-phase mains electric



motor or by a 12-V. motor and heavy duty traction battery.

Two front wheels and two rear castors give easy manoeuvrability. A detachable platform can be supplied to facilitate use as a normal lifting truck.

To enable individual drums to be removed without disturbing the rest, two sizes of barrel rack, to hold either six or nine standard drums, have been designed for use with the stacker.

Further details can be obtained from the manufacturer, Powell & Co., Burry Port, Carms., South Wales.

Automation for the Small Firm

THE Gresham unit sequencing system enables any manufacturing process to be sequentially controlled, automatically, from a central position. It permits major benefits of full automation to be enjoyed without excessive capital costs.

The controller implements instructions automatically in accordance with a predetermined programme of operations. It is actuated by electrical signals received on completion of each stage of production and controls operations such as mixing, heating, cooling, pumping and conveying. With it, a sequencing controller can be built up to meet individual requirements.

Further details can be obtained from Gresham Developments Limited, Thirlestone House, Uxbridge Road, Hampton Hill, Middlesex.

Automatic Weighing

A STANDARD electronic weight-control equipment is available which makes use of suspension- or compression-type load-cells. This unit is likely to be of interest in connection with the bulk handling of fairly heavy material normally handled in tanks, hoppers, hoists and conveyors.

Typical applications include maximum weight control on mineral hoists, where the loaded skip weight is checked; control of sand in batching hoppers in foundry work; checking of weight of beer in storage tanks, and control of load on lengths of conveyor.

One, two, or three load-cells support the load, e.g. hopper, conveyor section, truck or loading platform. Alternatively, the load may be suspended from up to three suspension load-cells.

The cells are connected to a remote relay unit which integrates output. The current is monitored and, on reaching a value corresponding to selected operating weight, the relay actuates the control mechanism.

The cells are of standard construction. The relay unit consists of a withdrawable chassis housed in a cast weatherproof case suitable for outdoor mounting, or in a sheet steel case with hinged lid for indoor use. It can also be supplied in a flameproof version.

The equipment is suitable for the range of weights normally covered by standard load cells, from 50 lb. up to a thousand tons or more, and is provided with operating adjustment over any desired range of weights. It gives repetitive accuracy of better than 1 per cent.

Price of a typical unit for weights up to 2,000 lb. employing one load cell and with relay unit in a sheet-steel case, is £120.

Further details can be obtained from Elcontrol Limited, Wilbury Way, Hitchin, Herts.

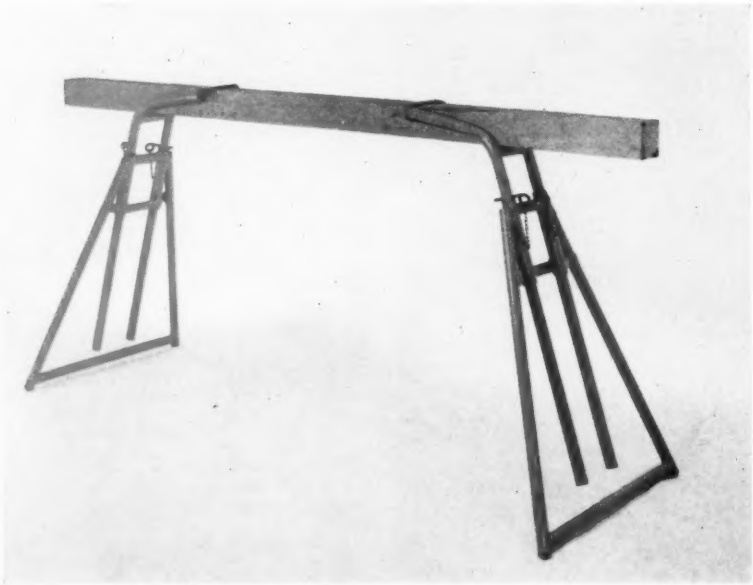
Boring Tool Holders

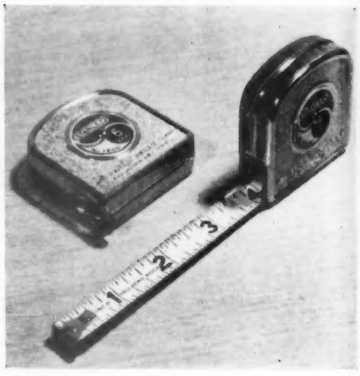
THE "Eclipse" range of tool holders has been extended by the addition of three new models incorporating the following features: the cutter bar can be positionally adjusted or removed without interference with the setting of the holder itself; each holder is supplied with a double-ended cutter bar in which the two cutter slots are machined at an angle of 90 deg. and 45 deg. respectively, and, in both cases, the cutter is held in position by an Allen grub screw.

The three sizes are supplied with $\frac{3}{8}$ in., $\frac{7}{16}$ in., and $\frac{9}{16}$ in. dia. cutter bars respectively which in turn hold cutters which are $\frac{1}{8}$ in., $\frac{3}{16}$ in. and $\frac{1}{4}$ in. square.

Each holder is supplied with two H3 cobalt high-speed steel square cutters, jig-ground on one end only for immediate use at 90 deg. and 45 deg. respectively. Spare cutters are also available and are included in the manufacturer's standard range of lathe tools.

Further details can be obtained from the manufacturer, James Neill & Co. (Sheffield) Ltd, Sheffield 11.





Improved Pocket Rule

THE Stanley "Pull-Push" rule is an improved extending steel pocket rule with a "D"-shape, chromium-plated case, handy for the pocket, and with a 2-in. base which allows its use for accurate inside measurements as well as for ordinary work.

Accuracy is ensured by a sliding hook at the end of the blade which automatically compensates for its own thickness on inside and outside measurements, and a mouth which exposes graduations on either side of the blade to eliminate sighting error.

Because of its unusual flexibility it can be bent round curves, corners, and irregular surfaces, and down to a diameter of 1-in.

The rule is available in 6-ft. and 10-ft. lengths at 7s. 6d. and 10s. 6d. respectively. It is also made in 2-metre and 3-metre lengths graduated in millimetres, or in combinations of both English and metric systems, at the same prices.

Blade replacements are available.

Further details can be obtained from Stanley Works (G.B.) Limited, Rutland Road, Sheffield, 3.

Trestles

THE Unimer fixed and telescopic trestles have been developed to save time and costs in collieries, and might prove suitable for railway and engineering work. In nine standard fixed sizes rising at intervals of 6 in. from 16 in. to 59 in., and three telescopic sizes from 27 in. to 78 in., the trestles can also be made to special order.

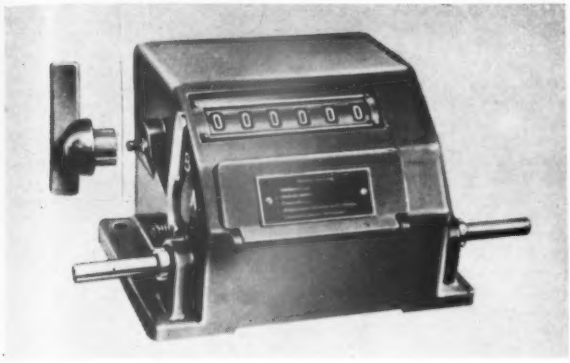
A standard unit consists of a pair of shaped tubular steel legs joined by three crossbars. Each end of a 3-in. by 4-in. beam is slipped between the top two crossbars of a trestle unit. The wooden beam operates as a sprag when locked in the arms of the trestle, so that the greater the weight applied to the platform on the trestles, the greater the lock. The telescopic trestle is similar in design, save that the units form adjustable extensions of a trapezoid framework. An important factor is that the base of the trestle is fixed, the extensions being made from the top.

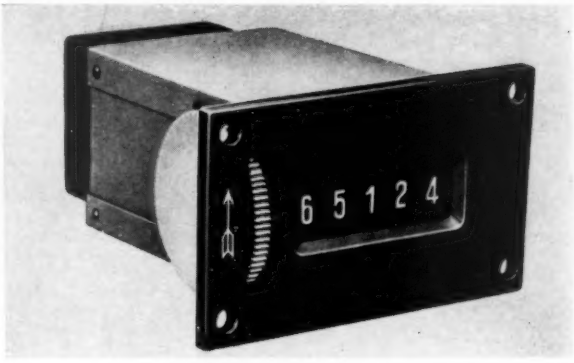
Further details can be obtained from Causeway Reinforcement Limited, Five Ash Works, Dover Road East, Northfleet, Kent.

Grinding Attachment

AN attachment for grinding solid circular planing, tonguing, and grooving, and profile-ground mould cutters is available for use with new or existing Robinson SQ/E electric lap grinders.

The SQ/E is primarily designed for grind-





ing laps on wide bandsaws before brazing or straight-grinding thick or thin cutters. It consists of a main frame carrying a grinding head and a tilting work table to which is clamped the wide bandsaw or cutter.

The circular cutter grinding attachment replaces the tilting table and can be quickly positioned and fixed. The cutter carrier embodies a dividing head and is mounted directly on one of its two arbors, depending on the hand of the cutter. It can be adjusted laterally and toward or from the grinding head to suit the cutter being worked.

A saucer-type grinding wheel mounted on an extension arbor fits to the grinding head in place of the cup grinding wheel normally fitted. The grinding head is directly driven by a 1-h.p. 2,750-r.p.m. motor. It runs on ball-bearing anti-friction rollers along vee slides and can be moved smoothly and effortlessly by hand across the cutter. A handwheel - and - screw vertical adjustment allows the wheel to be finely set for cut. The grinding wheel operates in a dust hood which can be connected to a dust extraction system. Rebound buffer-stops cushion the extreme movements of the grinding head.

Further information can be obtained from the manufacturer, Thomas Robinson & Son Ltd., Rochdale.

Furnishing Fabric

A NEW furnishing fabric is available which wears five times as long as ordinary wool moquette and from which all marks and stains—including those made by ink, wine and oil—can be removed by a damp cloth. It is now in use on the newest trans-European express trains in preference to first-quality moquettes.

The fabric, which under the name Lyflon will be used to upholster the British importer's range of furniture, is woven from synthetic fibres produced exclusively by Farbenfabriken Bayer A.G. of Germany. It looks and feels luxurious and not unlike velvet. Upholstered with it, furniture will sell at about the same price as that covered with good-quality moquette.

Its resistance to stains results from its non-absorbency: liquids and loose dirt remain on the surface and do not soak in. A cloth dampened with ordinary tap water—plus a little detergent when the mark is severe—will quickly remove all traces of foreign matter even when this has been present for some while.

The material is extremely tough, and is fast to light. It possesses strong resistance to water, humidity, rot, moths, insects, and detergents.

In Britain it will appear on the Contessa range of furniture produced by S. Morris & Sons (Leeds) Ltd., and, on a contract basis, will become available from a new company called Luxurious Textiles Limited. Further information regarding the new material can be obtained from S. Morris & Sons (Leeds) Ltd., Carlton Works, Pickering Street, Armley, Leeds, 12.

Pre-determining Batch and Impulse Counters

A NEW multi-circuit batch counter has two or four pre-set count positions. Multiple pre-determining counters are particularly useful where several warning or control signals are required at different stages of a process. The instruments can count shaft rotation, electrical impulses, or strokes (oscillatory movements). The counters change over two or four independent electrical contacts when the respective numbers are reached, and the whole cycle is repeated by depressing a zero set lever or turning a detachable key. Electrical re-set is also available.

Single pre-determining batch counters are also available and these are made for electrical or mechanical release or for giving an audible warning signal only.

Both single and double counters are available up to six digits and quadruple counters up to three digits. In each case numbers corresponding to the various circuits are adjusted independently.

Also available is an electrical impulse counter which can be built into control panels and can count up to 20 impulses per sec. (or more in special execution). The display panel is 2.5/8 in. by 1½ in. and the counter depth is 3¼ in.. The counter is made for d.c. and a.c. pulses. Minimum pulse length being 25 millisec. for d.c. and 33 millisec. for a.c. Average lifetime of the counter is 180 million counts. The counter is available in non-reset type or with an instantaneous re-setting knob or with a reset key. A counter is in development which will count up to 50 pulses per sec.

Both counting instruments are available from Radiatron, 7, Sheen Park, Richmond, Surrey, from which company further particulars can be obtained.

Rustproofing Process

THE Metal Finishing Division of the Pyrene Co. Ltd. announces that, by arrangement with the B.B. Chemical Co. Ltd., it is now marketing the Endurion process, an addition to its established range of Parkerizing rustproofing finishes for the treatment of ferrous metals.

The Endurion process is a simple immersion treatment used in conjunction with Parkerizing zinc phosphate systems. The light grey coating produced can be waxed, oiled, or painted. Optionally the natural grey coating can be coloured by dyeing followed by waxing, oiling, or lacquering. Developed in the United States, the process is patented both there and in the United Kingdom.

Further details can be obtained from the Metal Finishing Division of the Pyrene Co. Ltd., Great West Road, Brentford, Middlesex.

Broxbourne Station Reconstruction

The Eastern Region of British Railways has announced its plans for a major remodelling scheme at Broxbourne, Hertfordshire, in preparation for the electrification of the line from Liverpool Street to Bishops Stortford, due for completion next year. These include the resiting and complete reconstruction of Broxbourne Station; altering the layout of the platforms and tracks thus eliminating a bottleneck; building a new signalbox; constructing a new goods and coal yard; and raising the centre span of a nearby roadbridge. Work has already started and will be finished in time for the changeover to the electrified services.

Layout of Station

A new approach road and forecourt, where there will be a car park for 84 motorcars, a taxi rank, and bus terminal point, will serve the new station, which will be sited north of the present 70-year-old building. A single-storey block will contain the booking hall with mechanised ticket office; the enquiry, left luggage, and parcels offices; and a store for 65 cycles.

Connecting the booking hall with the two new island platforms will be a dual corridor overbridge, one for passengers and the other for parcels traffic and staff. On this bridge, looking on to the main lines, will be the waiting rooms and the stationmaster's office. Enclosed waiting-room shelters will be erected on each platform.

Two island platforms are being provided to enable electric trains to and from Hertford East and Bishops Stortford to be divided and combined on the outer loop lines, thus leaving the two centre lines free for the passage of through trains. So that connections to the main line can be made without the necessity for costly bridge works, the new platforms will be sited north of the existing platforms and will accommodate eight-car trains. Provision has been made for them to be extended to take 12-car trains should these become necessary in the future.

Colour-light Signals

Combined with the extensive alterations to the track a new signalbox is now under construction. The remodelled layout will be operated electrically on the route-setting principle from the control panel in the new box. The existing semaphore signals will be replaced by searchlight type colour-light signals, controlled by track circuiting on all lines in the area.

The installation of the overhead line equipment will necessitate the raising of the centre span of the Nazeing Road Bridge, immediately south of the station, to provide the requisite clearance for the high voltage wires. Alterations to the track have already begun together with the laying out of the new goods and coal yard. As well as resiting this yard, it has been necessary to provide additional facilities to meet the increased requirements of traders in the area. Provision has been made for future mechanised handling of coal traffic.

The new station was designed and the work is being carried out under the direction of Mr. A. K. Terris, Chief Civil Engineer, Eastern Region, and Mr. H. H. Powell, Regional Architect. The general contractor is W. & C. French Limited.

Britain's Railway Queen 1959-60

(*See editorial reference on page 163*)

Mr. A. Hallworth and Lord Rusholme standing behind the newly-crowned Railway Queen, Miss Hazel Dobinson, with the retiring Queen, Miss Gloria Cripps, on the right. Miss Dobinson's robes were donated by British Celanese Limited

Open Day at Longmoor

THE Transportation Training Centre, Royal Engineers, Longmoor, Hampshire, held an open day on September 12. It was primarily for parents, old comrades and invited individuals. Unlike previous public days, when very wide publicity was given, on this occasion the event was only publicised in local papers, certain technical journals, and posters in nearby towns and villages. Displays and demonstrations were similar in all respects to previous Public Days. The camp was open from 2 p.m. to 6 p.m. In addition to railway operation, technical demonstrations included; re-railing by a 45-ton Ransome & Rapier railway breakdown crane, diving, use of ramp-wagons, emergency railway bridging, the signal school, locomotive running and workshop practice, and a map printing vehicle in operation. The Movement Control School, Longmoor Museum, and a Port & Inland Water Transport Exhibition were among the exhibits to be seen. The public was able to visit barrack-rooms, cookhouses and the Garrison Church. The R.E. Band played during the afternoon. Brigadier P. D. G. Buchanan, the Commandant, received official guests, and proceeds from the sale of programmes and tickets for rides were shared between the benevolent funds of the Royal Engineers and Royal Pioneer Corps.

Centenary of Death of Brunel

The President, Professor A. J. S. Pippard, and Council of the Institution of Civil Engineers on September 15, the centenary of the death of Isambard Kingdom Brunel, attended, at the invitation of the Clifton Suspension Bridge Trust, the unveiling of a memorial tablet to Brunel on the bridge. The ceremony was performed by the Dowager Lady Noble, grand-daughter of the engineer.

The party travelled to Bristol by the 1.15 p.m. from Paddington. British Railways, Western Region, arranged for the "Castle" class locomotive, *Isambard Kingdom Brunel*, to haul this train. The engine carried a special plaque on the smokebox.

Professor Pippard, in his speech at the unveiling ceremony, pointed out that the Royal Albert Bridge, Saltash, opened in the year of Brunel's death, was a fitting memorial of his greatness. It was also a symbol of the completion of the great feat of linking Paddington with Truro by railway, that feat to which Brunel devoted, and probably sacrificed, his life

If the bridge at Saltash was a memorial

of Brunel, Clifton Suspension Bridge was a monument to him. It was completed after his death and departed in some ways from his original design. The original chains, the earliest made to Brunel's design, had to be sold and were used on the Saltash Bridge, while the chains which hung there now were purchased when the Hungerford Bridge over the Thames was demolished.

Criticism of Brunel's Work

When Brunel laid out the Great Western Railway from Paddington to Bristol, Professor Pippard added, his beautiful masonry bridge over the Thames at Maidenhead came under fire on the ground that the arches were too flat, and some people believed that when the centreing was removed the arches would collapse. This did not happen.

The Box Tunnel also was criticised by geologists, including Dr. William Buckland. He maintained that the unlined portions of the tunnel were dangerous as they would fall because of the "concussion of the atmosphere and vibration caused by the train." Brunel in the light of his practical experience of the rock was unimpressed. Parts of the tunnel remained unlined to this day.

Brunel was a Vice-President of the Institution of Civil Engineers for nine years before his death, and would have been President in 1858 had he not been prevented from serving by ill-health.

Diesel-Electric Trains for S.R. Oxted Line

British Railways, Southern Region, has obtained the approval of the British Transport Commission for 19 three-car diesel-electric trains to be built at Eastleigh Works at an estimated cost of more than £1 million, to run between Victoria or London Bridge and Tunbridge Wells West, East Grinstead, and stations on the Uckfield line, via Oxted and Lingfield or Edenbridge Town. Because of the great demand throughout British Railways for diesel and electric trains, work on the Oxted line sets is unlikely to start before 1961.

The sets will be used as six- or nine-car trains on business services. Outside business periods short diesel trains will be used for practically all the London services on the line. Some business services will still be steam-operated, as it is not possible to allocate enough diesel trains for a complete changeover.

Travel on the Oxted line to and from London is increasing rapidly. It had been planned originally to continue with steam traction until the line could be electrified. Large housing developments have greatly increased the number of passengers during the past three years. It was decided, therefore, to introduce diesel-electric trains to effect a rapid improvement in the service. Plans for electrification have not been abandoned.

Examples of increases in traffic are shown in ticket issues. Forest Row issued 28,117 ordinary tickets in 1957, against 17,497 in 1955, and 892 seasons (657). Corresponding figures are: East Grinstead 139,981 (86,485) and 5,774 (2,459); and Oxted 168,792 (129,105) and 10,941 (8,436).

Diesel traction is expected to provide a more reliable and punctual service and more accommodation at peak traffic periods.

SILENTBLOC LIMITED MIDLAND AREA MANAGER.—Silentbloc Limited has appointed, as Midland Area Manager, Mr. F. S. Bryant, 217 Meridan Drive, Birmingham, 34. Telephone, Castle Bromwich 3408.

Staff and Labour Matters

Co-ordinated Policy for Nationalised Industries

At the Trades Union Congress in Blackpool last week the General Secretary of the N.U.R. moved a resolution which the Congress carried that "This Congress views with concern the apparent lack of co-operation between the nationalised industries and urges the General Council to take the necessary steps with the Labour Party to examine the need for a closer working arrangement between the nationalised industries, with a view to an efficient and co-ordinated policy in the interests of public ownership and the nation."

In support, it was argued that what one nationalised industry did often vitally affected another. The railways were abandoning steam locomotives for diesels and electric trains, while the gas industry was experimenting with oil. Railway workshops were being closed for lack of work yet most of the contracts for new diesels were being given to private companies. Mr. Tallon (A.E.U.), Chairman of the Employees' Side of the Railway Shopmen's National Council, complained that railway workshops were being shut. "Private firms get the plums, nationalised industries get the sack," he stated.

Shorter Working Week

The T.U.C. re-affirmed previous decisions on the shorter working week and deplored the continued resistance of employers to demands. The motion stated that in view of the speed of present technological change the introduction of a 40-hr. week without loss of pay was economically possible and had become an urgent necessity in maintaining a high level of employment. The motion further requested the General Council to inform the Government, industrialists, and all employers of their grave concern in this pressing problem, and of the intention to seek ways of reducing weekly hours of labour.

It was also stated that the T.U.C. should move from a negative to a positive attitude in this matter. In the face of the concerted campaign by employers it would be completely irresponsible for congress to allow the unions merely to present their cases as the circumstances occurred. He went on: "While we are prepared to co-operate in advancing industrial development and productivity, at the same time we demand our share of the results of those changes and increased productivity. We believe one of the ways in which we can share in them is by the introduction of a shorter working week.

N.U.R. Wage Claim

The N.U.R. has referred its claim for a substantial increase in rates of pay for railway salaried and conciliation staff to the next stage of the negotiating machinery, the Railway Staff National Council, and a meeting of the council will take place on October 23, 1959.

London Busmen

About 8,000 London busmen will receive wage increases of 10s. to 12s. a week by a decision of London Transport Executive to reduce the probationary period for drivers and conductors. Maximum rates of pay will be reached in one year instead of two years as at present.

Contracts and Tenders

Ocean terminal at Durban for South African Railways & Harbours

South African Railways has placed a contract with Roberts Construction Company, Johannesburg, for the construction of an ocean terminal at Durban Docks at a cost of £2,000,000. The project consists of cargo sheds on the ground floor, a pre-cooling shed and pre-packing depot on the first floor, and passenger halls on the upper floor. There will also be a helicopter landing area and a multi-storey office block for the harbour authorities. The building will cover an area of 180,000 sq. ft. and will be 90 ft. high. Passengers will be able to walk straight from the promenade deck of the liners on to the main floor of the terminal building. The contract will take over two years to complete.

British Railways Eastern Region, has placed the following contracts:—

W. & C. French Limited: provision of track sectioning cabin at Bishops Stortford, and feeder station at Pitsea

T. Fletcher & Co. Ltd.: reconstruction of parapets, spandrel walls, and repairs to arches of underline bridge No. 156 between Woodhouse and Waleswood

W. & C. French Limited: construction of new signalbox at Pitsea

J. & J. Dean Limited: construction of new signalbox and amenity building at Southend-on-Sea Central

Petbow Limited: supply and delivery of one 50-kVA. generating set and six 30-kVA. generating sets

Wellerman Bros. Ltd.: reconstruction and widening of overbridges Nos. 194 and 201 between Kelvedon and Colchester

The Dredging & Construction Co. Ltd.: demolition of underline bridge No. 46 over River Great Ouse between Clenchwarton and South Lynn Goods

Edward Holme & Co. (1931) Ltd.: supply and delivery of 15 40A. and four 80A. changeover contactor cubicles in connection with the Liverpool Street-Enfield-Chingford-Hertford East-Bishops Stortford, and London-Tilbury-Southend electrifications

British Railways, North Eastern Region, has placed the following contracts:—

Brims & Co. Ltd.: demolition of the old iron store at Greensfield Motive Power Depot, Gateshead

Denham's Engineering Co. Ltd.: one high-speed lathe and equipment for Walker Gate Carriage & Wagon Works

North Eastern Electricity Board: conversion of electricity supply at Thornaby

J. Cresswell Limited: diversion of sewers at Oswald Terrace, Thornaby

Yorkshire Hennebique Company: reconstruction of bridge No. 1 at Leeds City Station

R. Blackett & Son: builder's work on the Central Boiler Plant at Darlington North Road Locomotive Works

Raines (H. & V.) Limited: central heating system in the offices at Bradford Valley Goods Station

Automatic Telephone & Electric Co. Ltd.: 300/400 line telephone exchange at Middlesbrough Station

Tarslag Limited: reinforced concrete bridge abutments at Newport

The Special Register Information Service Export Services Branch, Board of Trade, has received calls for tenders as follow:

From India:

42 electric locomotives, 25-kV. 50-cycle a.c. freight traffic locomotives with maximum axle load of 21·3 *tonnes* and suitable for 5-ft. 6-in. gauge complete with all electrical equipment to particular specification No. EL. 104.59.

The issuing authority is the Indian Rail-

ways. The tender No. is Global Procurement Programme, No. G.P. 19 of Rolling Stock 1959-60. Bids should be sent to the Director, Railway Stores, Railway Board, State Entry Road, New Delhi, 2. The closing date is November 9, 1959. The Board of Trade reference is ESB/20937/59.

From Formosa:

35 bogie freight wagons
70 sets of connecting rods, for use in constructing wagons
1 set of couplers, draft gear, and accessories to make up a complete wagon coupling unit
1 set of air brake equipment and accessories
124 steel channels
883 steel angles
1,056 steel plates
55 steel bars
115 gas pipes
35 hand brake shafts
280 hinge door shafts
420 sets of hinge door arms
140 brake shaft brackets
210 hinge door shafts
140 sets of worms and worm wheels
70 kgs. of spring steel wire.

The issuing authority and address to which bids should be sent is the Central Trust of China, Purchasing Department, 68, Yen Ping Nan Road, Taipei, Taiwan (Formosa). The tender No. is US—622D.This purchase will be financed by the International Co-operation Administration (I.C.A.). The closing date is October 1, 1959. The Board of Trade reference is ESB/20912/59/ICA.

2,000 *tonnes* of 37 kg./m. rails in 15m. lengths, and an unspecified quantity of carbon steel bridge angles, plates, and bars

The issuing authority and address to which bids should be sent is the Central Trust of China Purchasing Department, 68, Yen Ping Nan Road, Taipei, Taiwan (Formosa). The tender No. is US—622B. This purchase will be financed by the Internatinal Co-operation Administration (I.C.A.), the agency through which the United States Government gives economic and technical assistance to other countries. The closing date is October 1, 1959. The Board of Trade reference is ESB/20911/59/ICA.

From South Africa:

7 tar heaters and sprayers, 500 gal. capacity.

The issuing authority is the Stores Department, South African Railways. Bids in sealed envelopes endorsed "Tender No. F.7986: Tar Heaters and Sprayers" should be addressed to the Chairman of the Tender Board, P.O. Box 7784, Johannesburg. The closing date is September 25, 1959. Local representation is essential. The Board of Trade reference is ESB/21296/59.

From Sudan:

An unspecified quantity of train lighting dynamos.

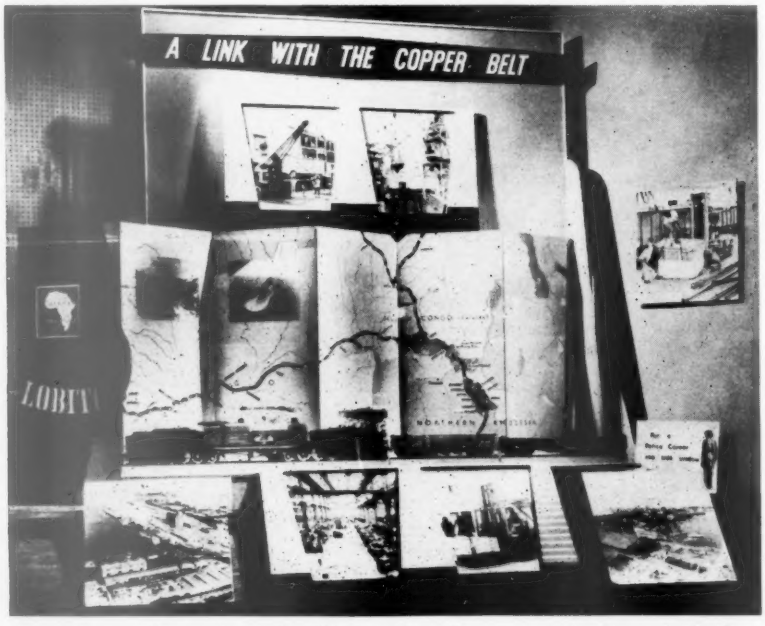
The issuing authority is the Stores Department, Sudan Railways. The tender No. is 1996. Bids should be addressed to the Controller of Stores, Sudan Railways, Atbara. The closing date is October 19, 1959. The Board of Trade reference is ESB/21372/59.

Further details relating to the above tenders together with photo-copies of tender documents, can be obtained from the Branch (Lacon House, Theobalds Road, W.C.1.).

Notes and News

The Vital Role of British Railways.—In the editorial article under this title on page 131 of last week's issue we referred to an article by Sir Philip Warter, as published in the *National Bank Review*. The name of the journal should have been *National Provincial Bank Review*.

Benguela Railway Window Display in London.—A display featuring the Benguela Railway Company was placed recently in the window of the Northern Rhodesian Commissioner's office in the Haymarket, London. In the centre of the window is a map of the 837-mile Benguela railway route in Angola from the Atlantic port of Lobito to the link with the railways of the Belgian Congo and Rhodesia. The display includes eight photographs of Lobito and the facilities there, and of a goods train crossing the Commandante Alvaro Machado Bridge on its way to the Copperbelt. A cut-out in the foreground features one of the Beyer-Garratt locomotives used on the railway, and two bogie wagons.



Beyer-Garratt locomotive and rolling stock and scenes on the Benguela Railway in a window display in the Haymarket, London

Rhonnda Transport Co. Ltd. Interim Dividend.—The Rhonnda Transport Co. Ltd. is to pay an interim dividend of 2 per cent free of tax, the same as a year ago.

November "Bradshaw" to Show Winter Services.—Because British Railways winter passenger timetables will not come into force until November 2, the August issues of *Bradshaw's Railways Guide & Hotel Directory* and the *Manchester A.B.C. Railway Guide* will be effective up to November 1. The winter services will be shown in *Bradshaw* to be published on November 2.

Repair of Diesel Railcar Power Units at Derby.—The illustration at the top of page 143 of our September 11 issue, shows an engine nearing completion of rebuild and others at intermediate stages on the final assembly line where the movement of engines is by pallet transporter. The piston sub-assembly section was not illustrated separately as stated in the caption.

New Ferodo Premises in Newcastle-upon-Tyne.—Ferodo Limited is to open on September 21, new premises at 3, Condercum Road, Newcastle-upon-Tyne, 4, tel.: Newcastle 39131-2. These replace the accommodation in Barras Buildings. The new warehouse, more spacious than the one it has replaced, will make available larger stocks of Ferodo brake linings, replacement brake shoes, clutch facings, Borg & Beck clutch plates, fan and drive belts, and stair treads, with consequent speeding up of replacement service throughout the North and North-East of England. The company's District Manager in Newcastle-upon-Tyne is Mr. E. B. R. Lockwood.

Seven Hundredth Metro-Cammell Railcar for British Railways.—The first order for diesel railcars placed with a private firm under the British Railways modernisation plan was for 72 railcars, awarded in May, 1954, to the Metropolitan-Cammell Carriage & Wagon Co. Ltd. This was followed early in 1955 by a further order for 339 railcars. The total of 411 consisted of two-, three-, and four-car sets. Early in 1957 a contract was placed with Metro-Cammell for a further 160 railcars. This allowed production to continue uninterrupted after completion of the previous orders. These contracts have been completed. Production continues against a later contract for 189 cars, to be delivered early in 1960. The last six sets incorporate buffets. The 700th railcar was delivered last week. When this latest contract has been completed, the company will have supplied a total of 760 diesel railcars to British Railways. Of these 465 will be in service in the Eastern and North Eastern, 159 in the Scottish, and 136 in the London Midland Regions.

George Cohen 600 Group Limited in 1958.—Profits before tax of the George Cohen 600 Group Limited for the year ended March 31, 1959, at £1,308,109 were £505,706 lower than for the preceding year. A final ordinary dividend is proposed of 7½ per cent, making 12 per cent for the year, as for 1957-58. Mr. Cyril M. Cohen, Chairman, points out that profits were adversely affected by the general decline in demand for capital plant and by reduced demands on the group's steel stockholding business. The whole of the issued share capital was acquired of G. Beaton & Son Ltd., manufacturers of vehicle components. The export trade of the Machinery Division of the

group continued to expand. Reduction in the demand for capital goods impaired sales of the main products of K. & L. Steelfounders & Engineers Limited. Much new equipment was installed during the year in the Foundry and Engineering Divisions of this subsidiary, and the resultant more economic working should help in taking advantage of the increased demand for castings. Mr. Cohen states that group business improved during the first four months of the current year. The annual general meeting will be held at Grosvenor House, London, W.1, on September 29.

Changes in Mobil Oil Co. Ltd. prices.—The wholesale price of Mobil Gas Oil has been reduced by ½d. a gallon to (inner zone) 1s. 3⅞d. a gallon. The Mobil Oil Co. Ltd. and its distributors have also changed the selling prices of some other grades. The new prices (inner zone) are: Mobilheat 1s. 3⅞d. a gal., Mobil Fuel Light 1s. 0⅜d., Mobil Fuel Medium 11¾d., and Mobil Fuel Heavy 11¼d. a gallon.

Investigation into "C"-Licence Transport.—The forthcoming general election has caused postponement of publication of the results of a nation-wide investigation into the working of more than 1,000,000 commercial vehicles operated under "C"-licence. The survey was undertaken by the Traders' Road Transport Association, the national body for "C"-licence operators. Publication was originally planned for some weeks ago and would have completed more than a year's work in analysing statistical data. The printing dispute already had delayed publication, now postponed to obviate distraction from study of the report.

Inspection Services Limited and R. F. Fraser-Smith Merge Interests.—Inspection Services Limited and R. F. Fraser-Smith, late of 69, Kings Cross Road, London, W.C.1, have merged their interests. Inquiries and orders for non-destructive testing equipment, including radioactive isotope containers, and a new portable magnetic crack detector, weighing 45 lb., giving an output of 750 A., with built-in changeover switch for operation on 100-120 or 200-250V. a.c., single-phase supply, should now be addressed to Inspection Services, Limited, Oldfields Trading Estate, Sutton By-Pass, Sutton, Surrey, tel. Fairlands 4546-7-8.

Overseas Visitors to Britain in July.—Overseas visitors to Britain in July totalled 277,900, 13 per cent more than in the same month last year. This brings total tourist arrivals for the first seven months of 1959 to 822,370, which is 10 per cent more than in the same period last year. Of July arrivals, 171,380 came from European countries, a 21 per cent increase over July, 1958. July also brought 60,640 visitors from the United States, 2 per cent more than in the same month last year. This brings the total of American visitors for the first seven months of 1959 to 207,440, which represents a 9 per cent increase on 1958.

L.T.E. Action to Attract Busmen.—To help recruitment of bus drivers and conductors, London Transport Executive has decided to pay maximum wage rates to new entrant busmen after one year's service. At present busmen do not receive maximum pay rates until after two years' service. An intermediate rate for staff with over six months' service is also being increased. Short-service busmen already working for L.T.E. will receive the new rates. This will result in 2s. a week more for staff with over six months' service and 4s. more for staff with between one and two years' service. About 3,000 drivers and conductors are affected. Other action to help fill vacancies is acceptance for training as bus drivers of men aged over 23 with driving experience. The lower age limit hitherto has been 24 years, with heavy goods driving experience.

Through Bookings to Rotterdam via Associated Humber Lines.—All stations in the North Eastern Region of British Railways can now book passengers through to Rotterdam by the Associated Humber Lines Limited services from Hull Riverside Quay. The ships taking these regular sailings are both new, mv. *Bolton Abbey* and *Melrose Abbey*. Each accommodates 80 first class passengers.

Closure of West Ord Public Delivery Siding, N.E. Region.—The decision by British Railways, North Eastern Region, to close West Ord public delivery siding, on the Tweedmouth—Kelso line, from September 14, is being re-considered. The Transport Users' Consultative Committee for the North Eastern Area, at a meeting on September 3, 1959, asked for postponement of this closure, and for the time being the existing goods traffic facilities will continue to be available.

The Railway Club Special Rail Tour.—The Railway Club are arranging a special rail tour to East Anglia on Saturday, October 3. The train will leave Fenchurch Street at 9.30 a.m., for Lowestoft, Gorleston and Yarmouth, travelling over the Framlingham and Snape branches. The return to Liverpool Street, due at 9.48 p.m., will be via Haddiscoe, Beccles and the Waveney Valley. The fare for the tour is 40s. and lunch will be available at 3s. 6d. and 5s. 6d. Bookings for seats and lunch should be sent with a remittance to the Honorary Secretary, The Railway Club, 320, High Holborn, London, W.C.1.

Diesels at Fifth Model Railway Hobby Show.—The 1959 Model Railway Hobby Show, to be held in Central Hall, Westminster, S.W.1, on September 23-26, will include a display of all available models of diesel locomotives and railcars which will be loaned by the British Transport Commission and manufacturers. This special feature is organised by Mr. W. F. Bolton who founded the British Region of the National Model Railroad Association of U.S.A. and is Service Manager of the Diesel Train Division of British United Traction Limited. Also there will be three large working layouts, two in OO-gauge and one TT-gauge.

London Midland Lecture & Debating Society.—The 1959-60 session of the British Railways (London Midland Region) Lecture & Debating Society opens on October 8, with a visit from the Southern Region Lecture & Debating Society. The Society, which was formed early in 1957 to promote good fellowship and to stimulate the interest of the staff in railway affairs generally, now has 600 members. Speakers in the 1959-60 programme include Mr. C. Hamilton Ellis, the well-known railway historian and writer, Mr. P. G. Masefield of the Bristol Aircraft Co. Ltd., and Mr. C. E. Dunton, Chief Civil Engineer of London Transport. During the session there will be an essay competition with book prizes on the subject "Should the railways be operated as a social service or as a business concern?"

Week-end Train Alterations on East Coast Main Line.—Extensive engineering works are to be carried out between Grantham and Doncaster, on the East Coast main line of British Railways, Eastern Region, during the next four week-ends. They include re-ballasting, re-laying, and bridge work. As a result all main-line trains leaving Kings Cross between 7.30 p.m., Saturdays, and 4.45 p.m., Sundays, from September 19 to October 11, will be diverted via Grantham, Lincoln, and Doncaster. Southbound trains will be similarly re-routed. Passengers travelling to and from Newark from Retford will be conveyed by special buses or by diesel services to and from Lincoln and Gainsborough. During the same week-ends certain trains will be subject to further diversions via Bishop Auckland because of engineering work in the North Eastern Region north of Darlington.

Price Reductions by Quasi-Arc Limited.—Price reductions will apply to all deliveries of mild-steel arc-welding electrodes made by Quasi-Arc Limited on and after October 1, 1959. Details will be announced later by the company which states that recent reductions in the price of hot-rolled mild-steel rods will enable its customers to benefit.

Firth Cleveland Finance Limited New Head Office.—Firth Cleveland Finance Limited has removed its head office to 12, Stratford Place, London, W.1, telephone : Hyd. 8621. The company which has branch offices in S.W. London, Newcastle, Sheffield, Manchester, Leicester, and Guildford, is concerned with financing hire purchase transactions for industrial plant.

North Eastern Region Swimming Championships.—The 1959 swimming and diving championships of the British Railways Staff Association, North Eastern Region, were held in the Sun Lane Baths at Wakefield on September 12. About 100 competitors took part in individual and team events. They included wives and children of railway staff. The awards were presented by Mrs. S. J. Judson, wife of the Assistant Regional Establishment & Staff Officer, North Eastern Region.

Britool Display at International Motor Show.—Jenks Bros. Ltd. will show a selection of Britool small tools at the Motor Show at Earls Court, London, on October 21-31, including the following which are to appear for the first time : the No. 875 Universal Hub Extractor with three, four, or five legs; the No. 1097 Dual-Purpose Spring Tester; the No. 1099 Torque Wrench Tester with capacity up to 1,700 lb./in. and direct readings in both English and metric units; reversible torque wrenches with push-through square drive and safety signal by touch, sight, and sound.

Stewarts and Lloyds Display.—The display of Stewarts and Lloyds' tubular steel street lighting columns at the annual conference of the Association of Public Lighting Engineers, September 15-18, has included 12 designs suitable for use on either "A" or "B" roads. The columns which are fitted with pendant, side-entry, and fluorescent lanterns, have bracket arms covering a variety of outreaches. The arms can be adapted for various types of lantern. The Council of Industrial Design's booklet, *List of Approved Designs*, includes all the S. & L. columns accepted by the Council. A brochure and lithographs of latest designs not included in the brochure is available on request from Stewarts & Lloyds Limited, Glasgow, Birmingham and London.

Award for Saving Woman Injured by Live Rail.—The *Daily Herald* Order of Industrial Heroism has been awarded to Fitter J. A. Norton, of British Railways, London Midland Region. In March, Fitter Norton found a woman lying across the electrified track below Church Road Bridge, Richmond. One foot was caught beneath the positive rail and her leg was burning. He wrapped his jacket round the woman and tried to free her. She tried repeatedly to clutch the live rail. He dragged her clear and held her for some minutes until two gangers arrived. The woman was taken to hospital with

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extensive injuries. The award was presented by Mr. G. W. Brassington, Assistant General Secretary of the N.U.R., at the Hop Bine Hotel, North Wembley, on September 17, in the presence of officers of the London Midland Region and members of the N.U.R. Badges for 30-year membership of the union also were presented.

Dunlop Rubber Co. Ltd. Change of Address.—New offices at 23-24, King Street, London, S.W.1, are now occupied by the Dunlop Rubber Co. Ltd. The offices, built on the site formerly occupied by the St. James's Theatre, have been named St. James's House. The company's head office, St. James's House, at 25, Ryder Street, S.W.1, has been re-named Dunlop House.

Tote Material-Handling System Demonstrations.—The Tote system of handling bulk materials for transport by rail, as described in our issue of October 24, 1958, is the subject of a series of demonstrations arranged by Pressoturn Limited, in conjunction with British Railways, North Eastern Region, as follow: Hull Paragon Passenger Station, September 18; Stockton Passenger Station, September 22; Manors (Newcastle) Passenger Station, September 23 and 24. Two railway coaches in one of which the Tote equipment is displayed and the other a cinema coach showing colour films, aim to convey to manufacturers and traders the variety of purposes for which the Tote system can be used.

Forthcoming Meetings

September 22 (*Tues.*).—Institution of Locomotive Engineers, at the Federation of British Industries, 21, Tothill Street, Westminster, at 5.30 p.m. Presidential Address by Mr. R. A. Smeddle.

September 23 (*Wed.*).—The Railway Correspondence & Travel Society, South of England Branch, at the Junction Hotel, Eastleigh, at 6.30 p.m. Paper on "The Modified Bulleid Pacifics," by Mr. R. G. Jarvis.

September 24 (*Thur.*).—Railway Correspondence & Travel Society, West Midland Branch at 64, Holyhead Road, Coventry, at 7.30 p.m. Paper on "This time—locomotives in general," by Mr. A. F. Cook.

September 24 (*Thur.*).—The Railway Club, at 320, High Holborn, W.C.2, at 7 p.m. Talks by Mr. R. G. Lucas and Mr. R. D. J. Walsh.

September 24 (*Thur.*).—The Model Railway Club, at Caxton Hall, Westminster, S.W.1, at 7.45 p.m. A film, including "Night Mail" from Euston.

September 25 (*Fri.*).—The Railway Correspondence & Travel Society, London Branch, at the Railway Clearing House, Eversholt Street, London, N.W.1, at 7.15 p.m. Paper on "The North London Railway," illustrated by lantern slides.

September 26 (*Sat.*).—The Railway Correspondence & Travel Society, Bristol and South Gloucestershire rail tour.

September 26 (*Sat.*).—Permanent Way Institution, East Anglia Section, at Ipswich, at 2.15 p.m. Paper on "Work of the B.T.C. mining service," illustrated by lantern slides, by Mr. M. Fletcher.

September 28 (*Mon.*).—Railway Correspondence & Travel Society, Northampton Branch, at the Liberal Club, Castilian Street, Northampton, at 7.30 p.m. Illustrated paper on "Some interesting continental locomotives," by Dr. P. Ransome-Wallis.

September 29 (*Tue.*).—Railway Correspondence & Travel Society, East Midlands Branch, at the N.C.S. Guild Room, Toll Street, Nottingham, at 7.30 p.m. Paper on "Railway scenes at home and abroad," illustrated by colour slides, by Mr. D. Swale.

Railway Stock Market

After advancing strongly after announcement of the date of the general election, stock markets lost some of their strength as investors sold to take part of their profits from the rise in values shown during the past few weeks. Prices tended to lose ground as a result, but buyers re-appeared later, though sentiment was affected to some extent by the set-back on Wall Street and uncertainty as to the trend at that centre. City confidence in a Conservative victory in the election was reflected by renewed buying of steel shares. These did not hold all earlier gains because of profit-taking. British Funds eased after the further uptrend in money rates in the U.S.A. which has led to renewed talk of prospects of an increase in our bank rate above its present 4 per cent.

Among foreign rails, Costa Rica stocks again attracted rather more attention, now that there is wider recognition of the outlook for the railway. Compared with a week ago, the ordinary stock has moved up from 16 to 17½, while the prior stocks were marked up, the first debentures to 80½, compared with 75½ a week ago, and the second debentures were 90½, compared with 85. Chilean Northern 5 per cent debentures were 60, and Paraguay Central first debentures, 22.

United of Havana second income stock remained at 6, San Paulo Railway 3s. units at 1s. 6d. and Brazil Railway bonds at 5¾.

International of Central America was slightly lower at $20½, and the preferred stock receded to $102½, compared with a quotation of $107½ a week ago.

Antofagasta ordinary strengthened from 13½ to 14, the preference stock rallied a point at 24, while the 5 per cent (Bolivia) debentures remained at 90½ Mexican Central "A" bearer debentures kept at 59¼.

Canadian Pacifics naturally reflected the Wall Street trend, but at $49¾ were only fractionally lower on balance, and only fractional changes were shown by the 4 per cent preference stock at 57¾ and 4 per cent debentures at 64¾. White Pass shares eased from $14 to $13¾.

West of India Portuguese capital stock was again quoted at 106½.

There has been a renewed demand for Westinghouse Brake shares, which were up to 48s. 3d., compared with 46s. 9d. a week ago, attributed to higher dividend hopes. On the basis of last year's 10 per cent dividend, the yield at the current price is little more than 4 per cent. Birmingham Wagon were good, having risen further to 29s. 10½d., compared with 27s. 6d. a week ago. North British Locomotive remained re-actionary after declining again on balance from 12s. 3d. to 11s. 9d. Beyer Peacock 5s. shares at 7s. 9d. were slightly lower on balance. G. D. Peters again quoted at 20s. 7½d., and Gloucester Wagon 10s. shares eased from 18s. to 17s. 6d. Charles Roberts 5s. shares eased from 12s. to 11s. 9d. Wagon Repairs 5s. shares also showed a small decline at 10s. at which there is a yield of 10 per cent on last year's 20 per cent dividend. The latter company has stated that profits for the current year are expected to be substantially lower because of the policy of the British Transport Commission on repairs and the position as to wooden wagons. If this meant that reduced resources are required, there might be a return of capital to shareholders. In the circumstances, the shares seem moderately priced.

An outstanding feature has been an advance in Davy-United from 72s. to 79s. on the chairman's annual review and the strong balance-sheet position. General Electric remained in favour on further consideration of the annual meeting, and at 39s. 6d. gained 1s. 6d. on balance; the loan stock was at a premium of 2½. Associated Electrical have come back from 61s. a week ago to 59s. 9d. English Electric were steady at 43s. 3d.

T. W. Ward lost 1s. at 100s., Vickers 6d. at 30s. 6d. and Stone-Platt eased a few pence at 51s. 3d. Pollard Bearing 4s. shares were firm at 29s. 9d. and Ransomes & Marles 5s. shares moved up from 21s. to 21s. 6d. Pressed Steel 5s. shares were 30s. 10½d. and Dowty Group 10s. shares 36s. 6d.

OFFICIAL NOTICES

CANADIAN MOTORWAYS LIMITED
Appointment of Divisional Engineer

Applications are being invited for the position of Divisional Engineer with the Canadian Motorways Group in Canada. The position is a new one and the successful applicant will be based on Winnipeg and be responsible for engineering matters, including fleet maintenance, in Western Canada, including the Provinces of Manitoba, Saskatchewan, Alberta and British Columbia.

Canadian Motorways Limited is a subsidiary of the British Electric Traction Co. Ltd., and through its operating Companies is engaged in the operation of freight services in every Canadian Province. In addition the Group operates a household goods moving and warehouse system throughout Canada. It is not concerned with the operation of buses or coaches. The headquarters of the Group are at Toronto where the Chief Engineer is located. The total number of vehicle units operated by the Group as a whole exceeds 2,000.

Any applicant for the position should have had suitable technical training and qualifications, up to at least graduate membership of the Institute of Mechanical & Electrical Engineers, and experience in heavy commercial vehicle maintenance work (lorries or buses) and of control of staff. It would be an advantage if he were under the age of 35.

Applications, which will be treated in confidence, should be sent to Mr. T. Robert Williams, the Chairman of Canadian Motorways Ltd., at Stratton House, Piccadilly, London, W.1, before October 2 next, and should give full particulars of the applicant's education, qualifications and career (including his present and all previous appointments), with a front cover sheet showing:

1. Name and address
2. Age
3. Whether single or married, and in the latter case, the number and ages of any children
4. Present appointment
5. Present salary

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CANADIAN MOTORWAYS LIMITED
Appointment of Workshops Superintendent

Applications are being invited for the position of Workshops Superintendent at the Toronto Headquarters of the Canadian Motorways Group. The successful applicant will take charge of a modern workshop at Toronto where the maintenance of the rolling stock of the Group is being concentrated.

Canadian Motorways Limited is a subsidiary of the British Electric Traction Co. Ltd., and through its operating Companies is engaged in the operation of freight services in every Canadian Province. In addition, the Group operates a household goods moving and warehouse system throughout Canada. It is not concerned with the operation of buses or coaches. The headquarters of the Group are at Toronto where the Chief Engineer is located. The total number of vehicle units operated by the Group as a whole exceeds 2,000.

Any applicant for the position should have had broad experience in workshop technique and supervision (lorries or buses) and have the ability to co-ordinate the various sections of a heavy commercial vehicle workshop. He should have an appreciation of systems of records and stores, and the ability to read drawings would be useful. It would be an advantage if he were under the age of 45.

Applications, which will be treated in confidence, should be sent to Mr. T. Robert Williams, the Chairman of Canadian Motorways Ltd., at Stratton House, Piccadilly, London, W.1, before October 2 next, and should give particulars of the applicant's education, qualifications and career (including his present and all previous appointments) with a front cover sheet showing:

1. Name and address
2. Age
3. Whether single or married, and in the latter case, the number and ages of any children
4. Present appointment
5. Present salary

September 11, 1959.